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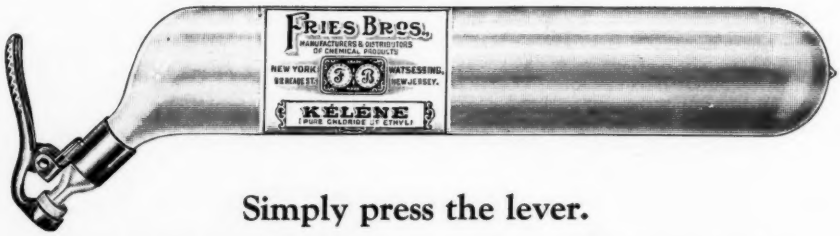

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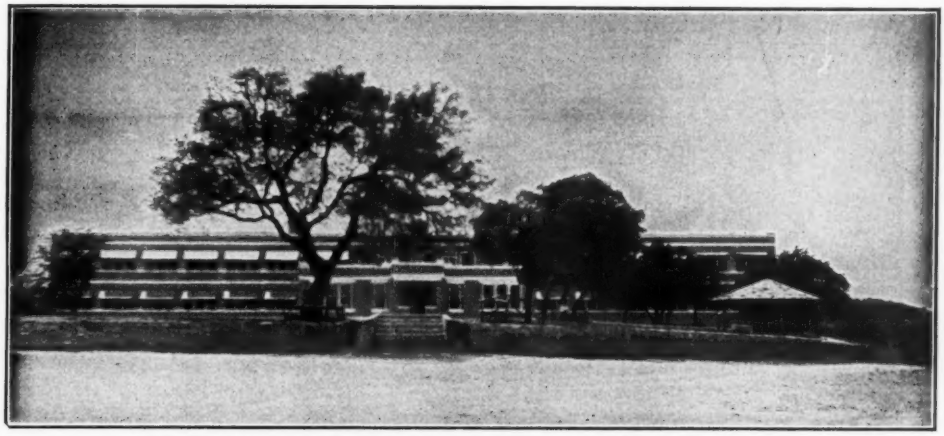

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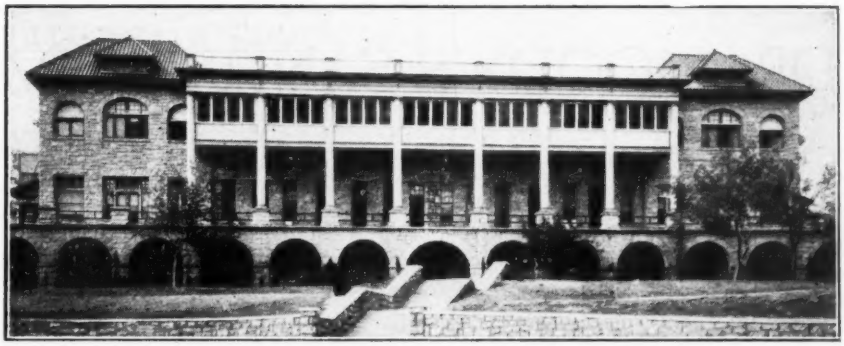

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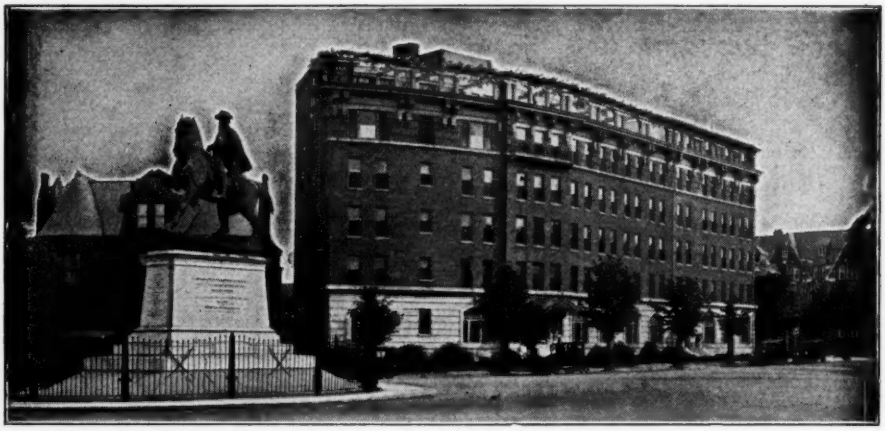

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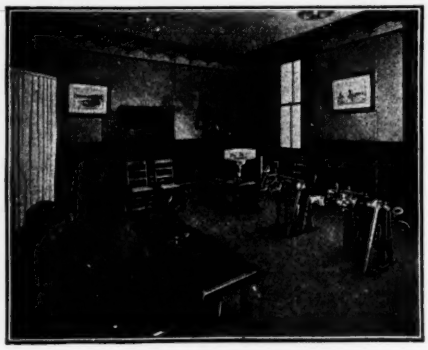

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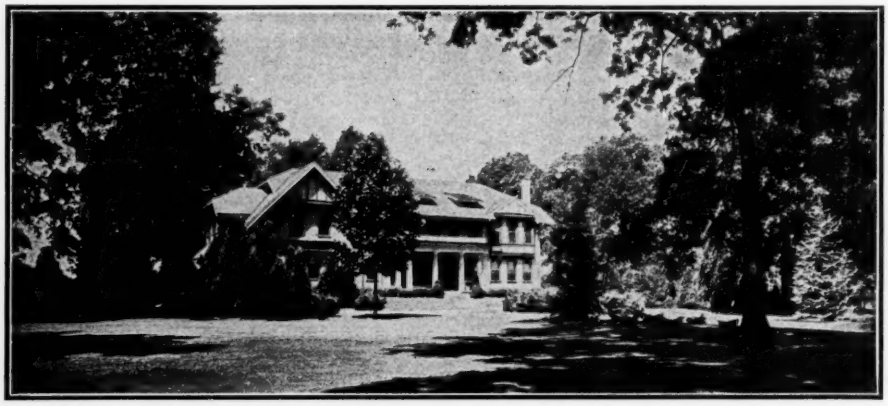

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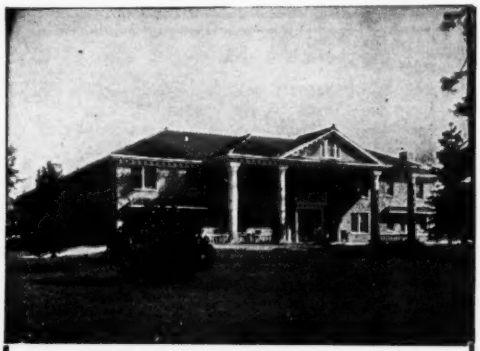

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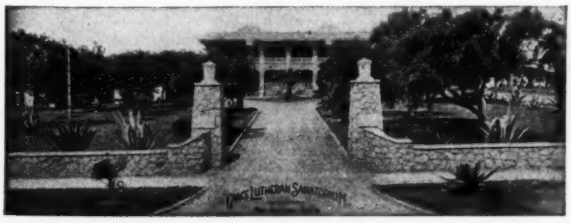

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COMPARISON OF METHODS USED FOR ESTIMATING THE SIZE OF THE HEART*

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St. Louis, Mo.

It is generally admitted that in the diagnosis of chronic heart disease the most important single determination that can be made is that of the size of the heart, for in only a small group of cases is it not enlarged. There are three ways of doing this: by locating the apex beat, percussion and the x-ray. Standard heart examination forms† provide amply for these different methods in a separate and definite way.

In locating the apex beat by inspection it is necessary to bring the patient into the best daylight obtainable and to view the bared chest from several angles, preferably in the standing or sitting position. Sometimes exercise will develop a visible beat not seen before. Failure to observe these details is responsible for indifferent results in the use of a method of examination widely employed, which gives, when properly appreciated, reliable information about the left cardiac border usually 1 to 2 cm. to the left of the point of maximum impulse. Especially is it desirable to develop some facility in this particular application of inspection, for those who do not use percussion and are without easily available x-ray assistance.

There follows after inspection as in all physical examinations, palpation. In applying this for the specific purpose of finding the apex beat, the point of maximum impulse should be sought and not simply an impulse. This is found usually by feeling along the interspaces in the nipple region. Sometimes it is directly behind a rib and cannot then be accurately defined. Feeble impulses can be strengthened at times by asking the patient to bend forward or exercise. Frequently impulses can be seen and not felt, and vice versa, which is a very good reason for using both methods, somewhat aside from the fact that one corroborates the other. The clinical purpose in ascertaining the position of the apex is to relate it in some way with obvious anatomical land marks, such as the nipple or the midclavicular line, subscribing by so doing to the idea that in long thin individuals the left border of the heart tends to approach the sternum as do also the nipple and midclavicular lines, while in short fat people the reverse holds true.

Table I gives the figures obtained in 19 consecutive examinations made on elderly men in the sitting position. The nipple and midclavicular lines, the apical impulse and the percussed left border of the heart have all been measured from the midsternal line. The clavicular line was measured from the episternal notch and also the internal joint which gives two midclavicular line figures one about 1 cm. longer than the other. Perhaps a better way would have been to add to the clavicle length the distance from the sternoclavicular joint to the middle of the episternal notch and then to use one-half of this figure as a measurement from the midsternal line in the frontal plane in the nipple region. It will be noticed that the nipple line is farther out than the midclavicular line. The apex beat was located in all but five cases and this in a group known to be particularly unfavorable for the use of inspection and palpation. Nine cases were positive by both methods while four failed in one, but were positive in the other (palpation). Percussion yielded uniformly consistent figures and showed the left border to be from 0.2 to 5 cm. (average 1.2) to the left of the apex beat. It is evident from this that at times the apex cannot be located but the left border can be determined by percussion in all cases, at least in this particular group examined. In about 80 per cent of the cases there are two or more reasons for believing that the heart reaches to a cer-

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*From the Washington University Unit Medical Service, St. Louis City Hospitals, City Infirmary and Frisco Hospital.

†New York Heart Association.

tain point, evidence perhaps more cumulative than merely additive. Comparing apex beat with nipple we find in 14 that eight exceed the nipple line by 2.8 to 0.5 cm. averaging 1.1 cm. while in the other six the beat is "in" from the nipple by 3.0 to 0.5 cm. averaging 1.6. The nipple line exceeds the midclavicular line in all but two cases ranging from 3.5 to 0.5 cm. averaging 1.8 cm. It we were considering at this time the matter of the heart's enlargement and wished to use the midclavicular line and nipple as dividing lines we could say that four-fifths or those outside the midclavicular line were abnormal in size while only one-half or those outside the nipple could be so considered.

The second method used to ascertain the size of the heart is that of percussion which seeks not only to determine the greatest distance to the left as in palpation and inspection but also to the right. The maximum distance to the right (M. R.) plus the maximum to the left (M. L.) constitutes the greatest transverse diameter of the heart, a measurement employed also in x-ray work. Here as in inspection it is very necessary to secure favorable surroundings in which to examine the patient. Percussion needs a quiet room. Otherwise trustworthy results cannot be obtained. Most clinicians use a light percussion and it is a great mistake to assume that this can be used effectively in a noisy ward. The standing or sitting position is insisted upon when at all possible. After marking the midsternal line the interspaces down to the sixth or seventh are percussed and measurements to the right and left from the midsternal line are made and recorded. In women with large pendulous breasts percussion is generally considered unsatisfactory or indeed impossible. This has not been my experience for with some assistance the heart borders can be determined to the right by pulling the right breast to the right and to the left by lifting and pulling upward the left breast when the point of maximum impulse can be located and the left outline percussed at least in the fifth space which is the most important one for the left measurement. Care must be exercised that the patient does not twist into an unnatural position in her efforts to help you. Then, too, measurements must be taken as percussed before the breasts are allowed to assume their former place.

A certain amount of practice is necessary to attain a fair degree of efficiency in percussion, but this is true of any other procedure that physicians use in the examination of their patients. Perhaps the most desirable asset for the percussor to have is a reasonable confidence in his ability to outline the heart. In working with students it has always seemed that they were but rarely of the opinion that a percussion outline was a reality until I began the practice of having them compare their measurements with those obtained by measuring a heart film. This has been with me more satisfactory than the use of fuse wire on the student's percussed outline for the reason that the wire stands out so sharply that it overshadows the x-ray picture which is sometimes not well defined. The outline of the wire and the heart are emphasized at the expense of the greatest transverse diameter which is the object usually sought in taking the film. Perhaps the most serious objection is due to the fact that a percussed diameter with its wire may show in a film as being at variance with the silhouette both on the right and left, yet the measurements are the same. This comes about through a difference in the midsternal line as drawn on the skin and a midspinal line as drawn on the film. Theoretically the midspinal and midsternal line should correspond, but for a number of reasons a satisfactory midspinal line cannot at times be drawn. The midpoint between the sternoclavicular joints is frequently employed for this purpose, but these two joints may not be in the same plane, so the interpreter

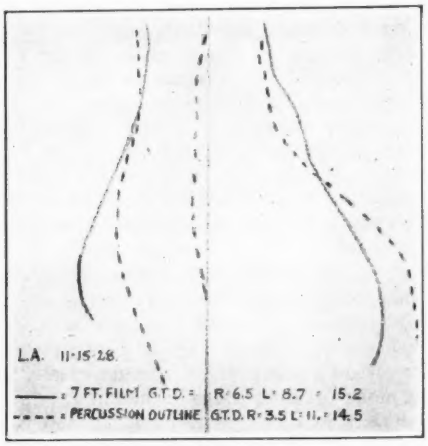

Fig. I

Represents the lines obtained from a seven-foot film of a heart in which a lead wire had been placed along the spinous processes and also along the percussed outline of the heart. The point of maximum impulse in this patient was 10.5 cm., the film maximum left 8.7 cm., the percussed maximum left 11.0 cm.

TABLE I

MEASUREMENT OF MIDCLAVICULAR AND NIPPLE LINES TOGETHER WITH LOCATION OF APEX BEAT AND DETERMINATION BY PERCUSSION OF THE LEFT CARDIAC BORDER IN 19 ELDERLY MEN CONSECUTIVELY MADE IN THE SITTING POSTURE

					Apex Beat			Percussion			
No.	Age	Clav.	M.C.L.	Nipple	Insp.	Pal.	Sp.	M.L.	M.R.	G.T.D.	Difference
1	76	17 15	8.5 7.5	10.5	Neg.	11		4	12	16	1 cm.
2	67	19 17	9.5 8.5	10	Neg.	Neg.		3	9	12	0.0
3	67	17 15	8.5 7.5	11	11.5	11.5		3	12	15	0.5
4	76	17.5 15.5	8.7 7.7	10	Neg.	9		3	10	13	1.0
5	79	18 16	9 8	11	Neg.	11.5	6	2.5	11.5	14	Same
6	65	21 19	10.5 9.5	9.5	Neg.	11		4	12.5	16.5	1.5
7	67	18 16	9 8	12	12.5	12.5	6	4	14	18	1.5
8	63	17 15	8.5 7.5	10	11.5	11.5	6	4	12.5	16.5	1.0
9	70	16 14	8 7	10.5	Neg.	Neg.		4	11	15	0.0
10	66	18 16.5	9 8.8	11	8	8	5	2.5	9.5	12	1.5
11	72	17 15	8.5 7.5	12	10	10	5	3.5	11	14.5	1.0
12	83	18 16	9 8	9.5	8	8	5	3	10.5	13.5	2.5
13	62	18 16	9 8	8	Neg.	Neg.		4	10	14	0.0
14	60	19.5 17.7	9.7 8.8	9.5	7.5	7.5	5	6	8.7	14.7	1.2
15	65	17 15	8.5 7.5	8.5	9.5	9.5	6	4	10.5	14.5	1.0
16	71	17 15	8.5 7.5	9.5	Neg.	Neg.		2	8	10	0.0
17	73		8.7	10	12.8	12.8	6	2.5	13	15.5	0.2
18	71		9.2	12	Neg.	Neg.		4	9.2	13.2	0.0
19	75		8.2	10	9	9	5	4.2	11	15.2	2.0

The upper measurement of the M.C.L. "pair" represents figures obtained by starting at the suprasternal notch, the lower from the joint. The average age was 70—and figures (the difference) for last column to right 1.2 cm. (average).

of a film of this kind is forced to draw his midspinal line through the center of the trachea if visible or through the middle of the supracardiac shadow. *Figure 1* shows such a case where there is substantial agreement between the measurement of the percussed and x-ray greatest transverse diameter but the superimposed outlines superficially considered show a wide difference. It might be said that two mistakes have been made by the percussor, one on the right and one on the left. However, we have the point of maximum impulse in this case recorded as 10.5 cm. from the midsternal line while the silhouette of the left border is only 8.7 cm. from the midspinal line. The influence of rotation will, of course, have also to be considered here. It is difficult to describe a technic for percussion, but a light palpatory mediate percussion perhaps describes what I have come to use in my own work. Percussion can be used quickly, repeatedly and with little disturbance to the patient. However, there is always a possible error of 1.5-2 cm., the width of the pleximeter finger, and it is not very satisfactory in extremely fat individuals or those with marked emphysema.

The x-ray is employed extensively to depict the heart. It of course gives, not a photograph but a silhouette produced by the rays. The fluoroscope, orthodiascope, ordinary and 2 meter films are used for this purpose, the latter giving almost a true picture of the heart's size under perfect conditions of x-ray technic, posing, and so forth. Perhaps the most serious drawback to the film resides in the fact that it does not at

times show the apex on account of the dome of the diaphragm, and efforts to overcome this such as requiring a deep inspiration, have the effect of moving the left border in so that the result obtained is not a true index of the width of the heart. It is not usually possible when viewing a given film to tell in just what phase of respiration it was taken, as it is not an easy matter to have patients suffering from heart disease follow the directions usually given. Next in importance comes the distortion due amongst other things to rotation of the patient. It has the effect of changing the maximum right, maximum left ratio as compared with the non-rotated position. It happens, too, that the cardiac outline is not always so clearly defined as one would wish. Two persons then will not mark it at the same place always. There are possibilities of error in the purely x-ray technic of taking the film which can be largely corrected by care, but in routine work they are apt to creep in. So it comes about that a 1 to 2 cm. x-ray error is allowable in clinical work.

Since 1923, from time to time I have outlined by percussion, usually cardiac cases able to sit up in a chair and then requested a 2 meter film and measurement of the greatest transverse diameter. Subsequently I looked over these films and made such notes as the situation seemed to warrant. *Table II* represents the results of this investigation. It is difficult to handle the figures in a strictly comparative way for the reason that neither represents a known standard of comparison for the other. Above, I have mentioned some of the possible sources of error both for physical and x-ray methods and have shown you lantern slides illustrating these in some specific instances. Perhaps a comparison of methods can best be made by noting the agreement. Roughly there is a difference of over 2 cm. in 24 per cent, over 3 cm. in 8 per cent and over 4 cm. in 1 per cent. There were 82 examinations made by percussion and also by a teleroentgenogram. In three of these the greatest transverse diameter of the heart was the same by both methods while in the 78 remaining ones the percussed diameter was greater than the x-ray diameter in 37 and less in 41. The average difference between these whether greater or less was 1.5 cm.

In all of the 30 cases in which the point of maximum impulse was measured the percussed left border was up to or farther to the left than the impulse when measured from the midsternal line, maximum 3.5, minimum 0.3, average 1.4 cm. However, measuring from the midspinal line the left border of the silhouette reached or extended to the left beyond the point of maximum impulse in only 19 cases (maximum 3.4, minimum 0.4, average 1.2) while eleven cases showed a left border internal to the point of maximum impulse (maximum 1.8, minimum 0.1, average 0.6 cm.). It is to be remembered that the apex of the heart is a truncate cone and the anatomical left border of the heart is somewhat to the left. So the impulse is given by the contraction of the heart that is its systole while x-ray films and percussion figures are developed from the heart in diastole. It may be, too, that the rotation of the heart during its systole is a factor to be considered. It is interesting to note that the average distance of the left border of the heart as obtained by percussion from the point of maximum impulse is in this group of thirty cases 1.2 cm. which happens to be exactly the figures obtained in a similar comparison shown in *Table I*. If we are to consider the point of maximum impulse as marking almost the left border of the heart it must be said that the percussion border consistently reflects that supposition while the x-ray does so in only 64 per cent of the cases.

An interesting and to me a new group of cases has appeared in which the roentgenologist is unable to measure the heart on account of small pleural effusions particularly on the left side. For a long time I have thought that the difficulties of the roentgenologist and the examiner by physical methods were as one in these effusion cases. However, within ten days I encountered two patients whose examinations changed my ideas somewhat. In one of these I outlined the heart by percussion without any difficulty and asked for a teleroentgenogram only to have reported an inability to measure the heart on account of a bilateral pleural effusion. Subsequently we removed the fluid and the report of the greatest transverse diameter showed only a few millimeters from the figures obtained by percussion a month previously. The other was quite similar as far as the films taken were concerned and in the physical examination a like difficulty was encountered by percussion in the fifth or sixth space at the left due to the fluid. However, no trouble was encountered in locating the apex beat which indicated to me the approximate outer border.

It is to be understood that in making the physical examinations tabulated above only a few

TABLE II

Comparison of Methods Used for Estimating the Size of the Heart

No.	Date Film	Film MR.	Film ML.	Film TD.	Date	Percussion MR.	Percussion ML.	Percussion TD.	Diff.	+ or −	P.M.I. From M.S.L.	Dif. Film	+ or −	Dif. Perc.	+ or −
1	8/21/23	5.0	12.8	17.8	8/19/25 sit	4.5	12.0	16.5	1.3	−					
2	4/ 4/25	6.0	9.0	17.0	4/ 3/25	6.0	13.0	19.0	2.0	+					
3	9/ 9/25	3.7	6.5	10.2	9/15/25			11.0	0.8	+	10.0	3.5	−		
4	9/25	4.5	11.0	15.5	5/ 9/25	4.0	10.5	14.5	1.0	−	10.5	0.5	+	=	=
5	5/ 5/25	4.5	11.0	15.5	5/ 8/25 sit	4.5	12.0	16.5	1.0	+					
6	1/ 7/24	7.3	11.5	18.8	2/26/24	4.0	14.5	19.5	0.7	+					
7	9/ 8/24	4.5	10.0	14.5	9/ 6/24 sit	3.0	9.5	12.5	2.0	−					
8	3/ 6/25	5.5	8.0	13.5	3/ 3/25	5.5	10.0	15.5	2.0	+					
	6/ 5/25	5.4	8.8	14.2	6/ 5/25	4.5	12.5	17.0	2.8	+					
9	1/11/24	6.5	9.5	16.0				16.0	0.0	0					
	2/ 9/24	5.5	11.2	16.7		3.5	14.0	17.5	0.8	+					
10	12/13/23	5.3	7.7	13.0	12/12/23	3.0	11.5	14.5	1.5	+					
11	3/12/25	5.5	12.0	17.5	3/10/25	3.0	13.0	16.0	1.5	+					
12	4/21/24	5.0	12.0	17.0	4/19/24 Lying	5.0	10.5	15.5	1.5	−					
13	8/16/24	5.5	10.0	15.5	8/15/24 sit	3.5	11.0	14.5	1 cm.	−					
14	8/25/24	6.5	12.0	18.5	8/23/24 Lying	2.5	9.0	11.5	6 cm.	−					
15	11/ 6/23	7.0	10.5	17.5		4.0	14.0	18.0	0.5	+					
16	3/26/24	8.0	11.5	19.5	4/ 1/24	7.0	13.0	20.0	0.5	+					
17	11/14/24	6.0	7.0	13.0	11/17/24										
18	12/ 7/23	10.0	10.0	20.0				18.5	1.5	−					
19	11/28/23	4.8	10.0	14.8	11/28/23	3.0	10.0	13.0	1.8	−					
20	9/25/25	6.0	10.	16.5				16.0	0.5	−					
21	8/15/24	6.0	9.0	15.0	8/18/24	6.0	9.0	15.0	0	0					
22	12/13/23	6.3	10.5	16.8	12/15/23	5.0	13.5	18.5	1.7	+					
23	6/ 1/25*	6.0	10.5	16.5	6/ 3/25 sit	2.5	11.5	14.0	2.5	−					
24	1/ 7/25	8.0	9.0	17.0	1/ 5/25	2.0	12.0	14.0	3.0	−	10.0	0.5	−	2.0	+
	1/14/25	7.0	8.8	15.8	1/10/25	2.0	12.0	14.0	1.8	−					
25	8/19/25	5.3	12.8	18.1	8/15/25 Lying	4.0	15.5	19.5	1.4	+					
					8/13/25 sitting	5.5	14.0	19.5	1.4	+					
26	4/15/24			18.7	4/16/25 sit	5.5	10.0	15.5	3.2	−					
27	9/11/25	7.0	14.0	21.0		4.5	17.0	21.5	0.5	−					
28	11/14/23*	Enl.	Enl.			4.5	15.0	19.5			15.0			=	
29	10/15/25	4.2	10.5	14.7	10/14/25 sit	4.0	12.5	16.5	1.8	+					
30	1/15/24	5.0	9.4	14.4	12/ 4/23	2.5	10.5	13.0	1.4	−					
31	10/24/24	8.0	11.0	19.0		7.5	11.0	18.5	0.5	−					
32	1/ 8/24			15.2	1/29/24	4.1	12.5	16.6	1.4	+					
33	12/11/23	4.5	7.0	11.5	12/13/23 sit	4.0	10.5	14.5	3.0	+					
34	2/25/2'	4.0	9.0	13.0	3/ 4/24	5.0	8.0	13.0	0.0	0					

*30 inch film.

TABLE II—(Continued)

No.	Date Film	Film MR.	Film ML.	Film TD.	Date	Percussion MR.	Percussion ML.	Percussion TD.	Diff.	+ or −	P.M.I. From M.S.L.	Dif. Film	+ or −	Dif. Perc.	+ or −
35	1/ 9/24			10.5	1/ 8/24	2.0	12.5	14.5	4.0	+	9.0			3.5	+
36	10/21/25	6.0	12.8	18.8	10/20/26	4.3	12.5	16.8	2.0	—					
37	4/21/26			14.0	4/21/26	2.5	11.3	13.8	0.2	—					
38	11/14/25*			17.7	11/27/25	7.5	10.0	17.5	0.2	—					
39	7/15/26			18.8	7/15/26	5.0	15.5	20.5	1.7	+	13.0			2.5	+
40	2/ 9/29	6.0	12.1	18.1	2/ 6/29	4.5	12.7	17.2	0.9	—	11.5	0.6	+	1.2	+
					sit										
41	1/18/29	5.0	11.1	16.1	sit	5.5	11.3	16.8	0.7	+	10.7	0.4	+	0.6	+
	4/29/29	5.3	11.7	17.0											
42	2/27/29	5.9	12.7	18.6	11/ 8/28	3.0	11.5	14.5	3.7	—	10.5	2.2	+	1.0	+
					sit										
43	11/14/28	5.8	11.5	17.3	11/14/28	4.8	14.0	18.3	1.0	+					
					sit										
					12/ 6/28			18.5	1.2	+					
					sit										
44	12/14/28	3.2	11.4	14.6	12/13/28	2.5	10.0	12.5	2.1	—	8.0	3.4	+	2.0	+
					sit										
45	9/27/28	6.0	12.4	18.4	9/24/28	4.3	13.7	18.0	0.4	—	10.7	1.7	+	3.0	+
					Lying	4.2	13.0	17.2	1.2	—	12.0				
46		4.0	6.0	10.0	sit	3.5	8.0	11.5	1.5	+	7.0	1.0	—	1.0	+
47	9/ 6/28	3.8	9.5	13.3	9/19/28	2.0	11.0	13.0	0.3	—	9.5	=		1.5	+
48	9/26/28	5.0	7.3	12.3	8/22/28	5.5	10.0	15.5	3.2	+	9.0	1.7	+	1.0	+
					sit										
49	10/30/28	3.8	5.6	9.4	10/30/28	2.3	6.2	8.9	0.5	—					
50		5.0	13.9	18.9	9/21/27	5.9	12.8	18.7	0.2	—					
					sit										
51	4/ 3/29	5.0	11.8	16.8	3/30/29	4.2	14.0	18.2	1.4	+	13.0	1.2	—	1.0	+
					sit										
52	8/ 1/24	6.0	9.5	15.5	7/29/24	5.5	10.5	16.0	0.5	—					
					sit										
53	8/30/28	3.0	7.2	10.2	8/30/28	2.0	8.0	10.0	0.2	—					
54	10/30/28	3.7	8.1	11.8	10/27/28	3.0	8.8	11.8	0.0	—					
					sit										
55	3/21/29	4.8	13.0	17.8	3/20/29	2.7	14.0	16.7	1.1	—	12.0	1.0	+	2.0	+
					sit										
56	10/30/28	4.8	13.0	17.8	10/26/28	6.0	14.5	20.5	2.7	+	12.0	1.0	+	2.5	+
57	10/31/28	5.0	11.4	16.4	11/16/28	5.5	13.0	18.5	2.1	+	10.0	1.4	+	3.0	+
					sit										
58	12/11/28	2.0	13.7	15.7	12/ 8/28	5.0	13.5	18.5	2.8	+	12.5	1.2	+	1.0	+
					sit										
					Lying			18.5							
59	1/ 3/28	7.3	11.0	18.3	1/ 5/28	3.0	12.0	15.0	3.3	—					
					sit										
60	5/12/28	7.5	11.5	19.0	5/ 6/28	5.7	12.5	18.2	0.8	—	12.0	0.5	—	0.5	+
					sit										
61	12/22/29	4.3	12.4	16.7	12/19/28	3.5	11.5	15.0	1.7	—	11.2	1.2	+	0.3	+
					sit										
62		3.6	11.8	15.4	3/ 1/29	3.5	12.0	15.5	0.1	+	12.0	0.2	—	=	+
					sit										
63	3/21/29	5.4	11.6	17.2	3/19/29	5.5	12.5	18.0	0.8	+	11.0	0.6	+	1.5	+
					sit										
64	11/27/28	5.8	12.4	18.2	11/20/28	4.5	13.0	17.5	0.7	—	11.3	1.1	+	1.7	+
					sit										
65	4/27/29	6.6	10.4	17.0	4/ 6/29	5.2	13.5	18.7	1.7	+					

*30 inch film.

TABLE II—(Continued)

No.	Date Film	Film MR.	Film ML.	Film TD.	Date	Percussion MR.	Percussion ML.	Percussion TD.	Diff.	+ or −	P.M.I. From M.S.L.	Dif. Film	+ or −	Dif. Perc.	+ or −
66	4/ 4/29	4.4	10.9	14.9	5/ 4/29	5.0	12.5	17.0	2.1	+	11.0	0.1	−	1.5	+
					sit										
67	3/24/29	4.0	9.6	13.6	3/22/29	2.2	9.5	11.7	1.9	−	8.5	1.1	+	1.0	+
					sit										
68	12/ 8/28	3.4	4.6	8.0	12/ 8/28	3.0	9.0	12.0	4.0	+	9.0	Nip'le			
					sit										
69	11/13/28	6.4	8.7	15.1	11/13/28	3.5	11.0	14.5	0.6	−	10.5	1.8	−	0.5	+
					sit										
70	3/ 1/29	5.1	12.6	17.7	3/12/29	4.3	14.0	18.3	0.6	+	13.0	0.4	−	1.0	+
					sit										
71	9/10/29	5.5	12.9	18.4	9/12/29	3.8	14.0	17.8	0.6	−	13.0	0.1	−	1.0	+
					sit										
72	3/28/29	6.4	13.6	20.0	3/27/29	2.5	15.0	17.5	2.5	−	13.0	0.6	++	2.0	++
73	8/17/29	4.8	12.8	17.6	7/17/29	3.5	14.0	17.5	0.1	−	12.0	0.8		2.0	
74	11/19/28	5.6	11.6	17.2							12.0	0.4	−		
75	7/13/28	6.3	13.3	19.6	7/11/29	5.0	15.5	20.5	0.9	+	14.0	0.7	−	1.5	+
					sit										
76	2/25/29	3.5	11.6	15.1	2/23/29	4.5	13.0	17.5	2.4	++					
77	7/19/29	5.8	14.2	20.0	7/18/29	6.7	16.0	22.7	2.7		13.0	1.2	+	3.0	++
78	10/31/29	4.2	8.9	13.1	10/31/28	2.5	10.0	12.5	0.6	−	9.0	0.1	−	1.0	
79	9/16/28	5.2	10.4	15.6	9/ 7/28	5.0	11.5	16.5	0.9	+					

Table II shows the figures obtained in measuring the greatest transverse diameter of the heart in 79 patients by percussion and by a teleroentgenogram. A plus difference means the percussion figure is greater than the film, while the minus indicates it is less. In 30 patients the point of maximum impulse was measured and compared with the ML, or the distance from midsternal line to left border as obtained by percussion and also by a seven-foot film. The "difference film plus" means that the film shows maximum left greater by the indicated cm. than the point of maximum impulse, while the minus sign indicates the film is less; so, too, the percussion plus and minus.

minutes were spent under the conditions usually found in a large hospital, and at no time were they repeated. Likewise the x-ray work was entirely routine. Undoubtedly both methods of examination could have been improved had a critical comparison been contemplated, but it was not. In estimating the size of the heart, either by physical or x-ray methods, it is well to remember a statement made by Groedel long ago, that in measuring the heart one should think in terms of centimeters and not millimeters.

Recently Dr. Paul D. White[2] has said:

> "Not only in the absence of a roentgenogram is it (percussion) useful, but it may be more accurate than the roentgenogram if the latter has not been obtained with the greatest care. Therefore percussion should always be done, if for no other purpose than to check the roentgen ray."

SUMMARY

There has been described a satisfactory clinical technic for the location of the apex beat by inspection together with palpation, and also the border of the heart by percussion. A table shown illustrates the consistent figures obtained when these methods of examination are used. The difficulties that arise from time to time in the use of the seven-foot film have been described. These are the dipping of the apex below the diaphragm; distortion of the shadow from rotation; inability to secure a satisfactory midline corresponding to the midsternal line, thereby at times changing the maximum right, maximum left ratio, especially when combined with rotation; lack of sharp outline from lung congestions, adhesions, pleural effusions, and so forth. A table has been presented in which the figures obtained in 82 examinations by both x-ray and percussion have been compared. These show a very good agreement (average difference 1.5 cm.). A special group of 30 cases has been shown in the same table in which the point of maximum impulse has been compared with the left border (maximum left) obtained by percussion and also by a seven-foot

film. This has been used as an aid and a check on figures so obtained. Several cases have been presented in which it had been impossible to secure measurements by x-rays, but by the use of physical examination methods this had been readily accomplished.

CONCLUSIONS

(1) Physical methods of examination should always be used whether or not x-rays also are employed.

(2) There is a group of cases in which physical methods alone can determine the size of the heart.

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DISCUSSION *(Abstract)*

Dr. Cyrus W. Strickler, Atlanta, Ga.—It is generally accepted by cardiologists, I believe, that the use of the x-ray is by far the best method for outlining the size of the heart. The orthodiagraph is probably the best method because the teleroentgenogram sometimes shows shadows that are very misleading, but here the heart can be inspected at the same time and do away with this source of error. I am quite in agreement, however, with Dr. Luton that if we practice percussion as it should be done in the large majority of instances we can come to satisfactory conclusions for clinical purposes. Percussion is of great importance. I agree fully with Cabot, the late Dr. Hoover and others that it is practically impossible, except in a few individuals, to percuss out the heart with any degree of certainty with mediate percussion. In cases of obesity, cases of emphysema, women with very large breasts, this method of percussion gives us very poor results. Immediate percussion is even better although it is not quite so satisfactory in my hands as orthopercussion. I might mention here Lerch's manner of percussion, which has been advocated by Fossier. It is not entirely satisfactory because you have to depend entirely upon the ear and unless the operator has a musical ear he is apt to fall into error. The sense of touch is of great importance, and by it one can tell the degree of resistance under the finger. Certain forms of auscultatory percussion give fairly accurate results in the hands of some operators. Sometime ago I read an article describing auscultatory percussion using the tuning fork. While I have had little experience with this form of percussion, I can understand why it might be useful in plethoric individuals and in women who have very large breasts.

Dr. Virgil E. Simpson, Louisville, Ky.—I agree with the essayist and others that percussion of the cardiac outline is a very practical means ordinarily for outlining the actual size of the heart. It is much more readily available than studies with the x-ray. The adoption of a uniform method of measurement is of some concern to the internist. The mammary gland with reference to the midsternal line is such a movable thing that it is of no moment anatomically.

If some such measurements as the following were adopted generally it would enable internists to speak in standardized and, hence, understandable terms of heart outlines. Take as anatomical points, the middle of the suprasternal notch, the outer end of the left clavicle and the tip of the ensiform. Drawing lines connecting these points forms, roughly, a triangle; a point one-half the distance between the midsuprasternal notch and the outer end of the clavicle is spoken of as the midclavicular line; the left border of the normal heart apex corresponds approximately with the midclavicular point. A line drawn from the ensiform to the left border of the apex and one falling from the midclavicular point to the left apical border completes the rectangle.

In the long barreled chest with a vertical heart the midclavicular point will be nearer from the midsuprasternal notch than in the patient of sthenic habitus with the heart in an oblique position.

In the physical examination after having established the triangle described, one percusses toward the left from the sternum, marking the point where cardiac dullness ends, then locates the outer border in the left third interspace and finally the outer border in the right third interspace. These lines, with their measurements, can be put on the physical examination sheet with pen or pencil as a part of the examination, and in reviewing the record one can tell at a glance whether and how much the heart is enlarged. In my office work I have a rubber stamp carrying the measurement lines and the stenographer stamps the diagram on the physical sheet and types in the figures.

Dr. Warren T. Vaughan, Richmond, Va.—I place more emphasis on the position of the apex impulse than upon the left border of dullness. When you can feel the point of maximum intensity inside the mammary line or the midclavicular line you may be reasonably sure that there is no hypertrophy. Of course, there are cases in which you cannot feel the apex impulse.

It is important to percuss, with the patient both supine and erect. One may percuss what appears to be a normal area of dullness with the patient supine, only to discover that in the erect position the dullness has moved well out towards the axilla. So where you cannot feel the apex impulse it is an excellent routine to percuss with the patient both supine and erect.

I was told an interesting story of heart percussion. Sir Thomas Lewis asked three clinicians to percuss out the heart borders of a patient, independently. He marked their findings with lead strips and then took an orthodiagram. None of the three agreed in all measurements with one another nor with the x-ray. The three clinicians were Sir William Osler, Sir James McKenzie and Sir Clifford Allbut. Of course the differences were not great.

Dr. Luton (closing).—My patients were all in a standing or sitting position when examined physically. There are three or four methods differing slightly which are used to determine the midclavicular line. These I describe in my paper as published. The main practical point I wish to make is that this measurement should be made carefully following a standard technic and not roughly estimated as is usually the case. Physical methods are not very satisfactory in an extremely fat individual. However, they can be used to advantage in women with large pendulous breasts, providing care is taken with some details described in my paper. Dr. Vaughan speaks of several eminent clinicians who have examined the same case, all of whom were found to

be wrong from the x-ray. Similar statements have very frequently been made, and it was for this reason that several years ago I determined to find for myself by direct comparison in a fairly large consecutive series just what the facts were as we deal with films and physical methods of examination in clinical medicine.

THE EFFECTIVENESS OF RECTAL ETHER IN WHOOPING COUGH AND ITS COMPARISON WITH OTHER METHODS OF TREATMENT*

By W. Ambrose McGee, M.D.,
Richmond, Va.

In few diseases have so many different plans of treatment[1] been used, with so great a lack of uniformity of results, as in whooping cough. It is, indeed, unfortunate that so little attention has been paid this prevalent and contagious disease. The lack of consistently good results with stock pertussis vaccine has caused many parents to view its use with skepticism and many physicians have ceased advocating it in the treatment of whooping cough. Because of this variance in results, the writer has endeavored to find a means by which quicker and better success may be obtained in the majority of cases.

In the treatment of many diseases, and whooping cough is no exception, it is usually felt that the earlier treatment is begun, the better are the results. The diagnosis of pertussis in its very early stages is often considered impossible, or at the most very difficult. Frequently physicians inform parents that it is impossible to say definitely whether or not their child has whooping cough unless he actually whoops. Two simple and reliable diagnostic aids are available for an early diagnosis of whooping cough. The work of Lawson and Mueller[2] and Sauer and Hambrecht[3] clearly demonstrated the reliability of laboratory aid in the catarrhal stage of pertussis. As early as 1898, Muniere[4] mentioned the value of white and differential blood counts in arriving at a positive diagnosis. In a series of 64 positive cases and 14 negative ones, previously reported by the writer,[5] an attempt was made to show the reliability of the aforesaid blood test in determining the presence or absence of pertussis. With those two simple and reliable diagnostic aids, one is hardly justified in waiting for the actual whoop before deciding whether or not the child in question has whooping cough. Not only is treatment more successful where an early diagnosis is made, but it seems reasonable to believe the spread of the disease will be arrested, for children with suspicious coughs will be isolated sooner. Likewise, as is done in France,[6] a more scientific quarantine can be imposed.

The director of the laboratory of the Virginia State Board of Health recently agreed to cooperate with the writer in attempting to make an early diagnosis of whooping cough by the cultural method, but he was prevented by the recent outbreak of poliomyelitis, which required all of his time and that of his co-workers. In the near future perhaps the opportunity will come and the Virginia State Board of Health will be able to assist in making an early diagnosis of pertussis, and in determining the time necessary for quarantine with different methods of treatment.

In attempting to make a diagnosis of whooping cough prior to the actual whoop, the signs and symptoms of that disease were carefully considered along with white and differential blood counts. A positive diagnosis was made from the character of the suspicious cough; the usual absence of marked bronchitis, post nasal catarrh and laryngitis; the presence of an epidemic or history of exposure to whooping cough, aided by a leucocytosis with a high lymphocyte percentage. An afrebile cough, paroxysmal and spasmodic in nature which increased in severity and was worse at night, and which failed to respond to the usual treatment, was considered suspicious of whooping cough.

Much information could be obtained from white and differential blood counts, after a child had had a suspicious cough for seven to fourteen days. In this small series of 150 cases, positive diagnosis of pertussis was made in 64 instances from white and differential counts, plus the signs and symptoms just mentioned.[5] Likewise a negative opinion was given in 14 cases which had a normal count after suspicious coughs of fourteen to twenty-one days' duration. Of the 64 positive cases, there were 14 which never were heard to whoop, but which resembled pertussis in every detail and showed evidences of communicability.[7] In no afrebile disease with a cough is there such a high leucocyte count with so large a proportion of lymphocytes as in whooping cough. The average leucocyte count in the 64 positive cases was 19,273, with 68.2 per cent lymphocytes. If more general use were made

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of the blood test, it would help materially in deciding whether or not pertussis was present. It would then be possible to start treatment earlier, which would be highly desirable, especially among young and delicate infants. Even if one is skeptical of the reliability of white and differential blood counts in making an early diagnosis of pertussis, he certainly has nothing to lose by the test and possibly much to gain.[5]

Fourteen cases diagnosed as negative from the signs and symptoms and white and differential blood counts, failed subsequently to develop pertussis. If a preventive vaccine had been used for those cases, one would have felt the vaccine had been successful, whereas, in reality, pertussis was not present. While preventive measures are justifiable for whooping cough in the light of our present knowledge, the ultimate results are open to doubt in many instances, for probably the child, or children, in question would not have had the disease either from non-exposure or from an inherited or acquired immunity.

Prior to the rectal use of ether, the speaker used plain and mixed pertussis vaccines, both as preventive and curative measures. In six instances where a preventive pertussis vaccine was given subcutaneously in large doses, when a brother or sister already had whooping cough, and the other child was naturally constantly exposed, the vaccine failed. Three of seven infants who were patients in a children's ward in which pertussis was suspected and later developed, failed to be protected by early and large doses of stock pertussis vaccine. Mishulow, Oldenbusch and Scholl[8] found no difference in the potency of stored pertussis vaccine after intervals of four to five years. The writer was also unable to get consistently good results with pertussis vaccine in the treatment of whooping cough in the few cases included in this study. While many men as Bloom,[9] Shaw,[10] Luttinger,[11] and others strongly advocate pertussis vaccines as preventive and curative measures, others as Holt,[12] Royster,[13] Sauer,[14] and the editor of the "Queries and Minor Notes" section of the *Journal*[15] *of the American Medical Association* are far from enthusiastic about pertussis vaccine. The Council on Pharmacy and Chemistry[16] of the American Medical Association states that the evidence for the value of pertussis vaccine for prevention and for treatment is questionable.

In view of the low percentage of good results with stock vaccines in many hands, other measures of treatment were considered by the writer. Intramuscular ether seemed to give a higher percentage of favorable results, judging from the reports of those using that method, than any other form of therapy.

The first man to use ether intramuscularly was Audrian,[17] who reported his six years' experience with that treatment in 1920. Subsequently others reported many cases with a high percentage of success. Intramuscular ether, however, has had one serious drawback, namely, the frequency of necrosis at the site of injection, even under the most favorable conditions. In 1925, Elgood,[18] of England, reported his experience with ether *per rectum* and ether intramuscularly. His percentage of success was identical with both methods. Elgood was the first to report his findings with rectal ether. Since his report, Goldbloom,[19] Magliano,[20] and Okutani[21] have also reported much success with rectal ether in the treatment of pertussis. Okutani[21] alone reported a large number of cases in which rectal ether was used, his series including 104 patients. He reports that paroxysms were controlled in 84.59 per cent, and that the percentage of effectiveness increased with the age of the patients. Those who, with an open mind, have given rectal ether a fair trial and have reported their results seem to be highly in favor of that method of treatment.

In order to get an unbiased opinion of results with rectal ether, the writer decided to try it in severe cases of pertussis and then to compare its results with those obtained from stock vaccines, ephedrine hydrochloride (as recommended by Anderson and Homan[22]), cough sedatives (as antipyrin and belladonna) and with no treatment. In addition, it was decided to combine rectal ether with stock vaccines and ephedrine hydrochloride, or with both, and also vaccines with ephedrine hydrochloride. Unfortunately, the number in each group is small, but it gives some idea of the comparative value of the different methods of therapy.

The entire group of cases was composed of 77 females and 74 males, the proportion of females to males being approximately the same as is usually shown by statistics.[23] Of that number 46 were under and 104 over one year of age. In the comparison of the outcomes of males and females, there was no difference, but results with patients over one year of age were better than with those younger. The percentage of effectiveness of rectal ether increased with the age of the patients. Children in private homes appeared to improve more rapidly than those in institutions, probably because the former had more

opportunity to play outdoors, had better diets, and were usually in better physical condition.

When the writer first used ether and olive oil *per rectum* in March, 1927, it was given every other day. Later, the mixture was given daily and in the great majority of cases it was administered twice daily. The usual dose was one dram of the mixture (equal parts of ether and olive oil) per nearest year of age, except to infants under one year when two drams of 25 per cent ether was injected twice daily. A number 18-20 French rubber catheter and a glass funnel were employed in injecting the mixture by gravity into the rectum. If there was a desire to defecate immediately after the ether was administered, pressure was made against the rectum to prevent passage of the medicine. In severe cases one, or even two, extra drams of the ether-olive oil mixture was given. The odor of ether could be detected on the breath in two to four minutes and for as long as four to eight hours. No detrimental effect on the kidneys, heart, lungs or rectum was observed, though carefully sought. Pyuria was not unfavorably influenced by this method, and in three instances a bronchitis was not exaggerated by the ether. As with vaccines, ether *per rectum* appeared to prevent complications. As a rule, rectal ether was administered for five to twelve days, according to the response of the patient. Cessation of vomiting and whooping was observed in the average case in four to six days when the ether was well retained, and more or less freedom from severe paroxysms was noted in seven to fourteen days. The great majority of infants and children retained the rectal mixture surprisingly well; in fact, the majority of the small number of patients who were not greatly improved in three weeks were ones who retained the ether poorly or were given the rectal treatment irregularly or for a shorter period of time than was ordered. Those patients who were practically free from severe paroxysm and were over vomiting and whooping in one week when quiet, were arbitrarily classified as excellent results (even though the entire course of the disease may have been only two to five weeks); in two weeks, as good; in three weeks, as fair; and after that time, as poor.

TABLE I

EFFECT OF DIFFERENT METHODS OF TREATMENT ON THE LENGTH OF THE COURSE OF WHOOPING COUGH

Treatment	*No. of Cases*	*Improved* (Days)	*Practically Well* (Days)
Ether	58	4.0	10.5
Ephedrine	12	16.0	24.5
Vaccine	15	16.7	28.0
Ether and Ephedrine	15	3.3	11.8
Ether and Vaccine	24	4.4	12.5
Ether, Ephedrine and Vac.	9	4.4	13.5
Ether and Combinations	48	4.0	12.4
Ephedrine and Vaccine	4	12.0	26.5
Cough Medicines*	13	14.5	28.5
No Treatment*	7	18.0	39.0

*Approximate length of time.

Many factors, as early positive diagnosis and treatment, cooperation of the mother and child, the strength and frequency of the ether-oil mixture and its retention, influence results and will no doubt give rise to varying outcomes in different hands. The simplicity of the treatment is certainly a great help to parents and the average child does not fear rectal ether when given by his mother as he does a hypodermic injection administered by the attending physician. Additional features that are in favor of rectal ether are little or no loss of weight and appetite and a much more restful night after the treatment has been given and retained for three to five days.

It is, indeed, difficult to attempt to draw conclusions from so small a series of cases, but from the consistently good results obtained with rectal ether, it is encouraging, to say the least, and at the present time the writer feels that rectal ether is the treatment of choice for whooping cough. If another physician can get just as good and consistent results with the method he employs, then, perhaps, he is justified in sticking to that form of therapy. The combination of other therapeutic agents with rectal ether gave no better results than rectal ether alone. While pertussis vaccines may give good results in the hands of a few, rectal ether is apt to give a higher percentage of good results in the hands of the majority, provided, of course, the child and mother cooperate. It may be of interest to note that ether alone or in combination with other forms of therapy, gave rise to a greater reduction of leucocytes per day[5] than did any other method. Perhaps the rectal mixture aided

TABLE II

RECAPITULATION OF THE AVERAGE EFFECT OF TREATMENT ON WHITE AND DIFFERENTIAL BLOOD COUNTS

		Average Decrease		
Treatment	*No. of Cases*	*Leucocytes Per Case*	*Per Day*	*Lymphocytes Per Case*
Ether	6	1041	104	0.5
Ether and Vaccine	9	1088	68	1.5
Ether and Ephedrine	3	1743	194	1.0
Eth., Eph. and Vac.	2	1075	107	1.5
Vaccine	6	864	41	1.7
Ephed.ine	1	200	40	....
Ephedrine and Vac.	4	755	36	0.3

TABLE III

COMPARATIVE RESULTS OF POSITIVE CASES OF WHOOPING COUGH

Treatment	Number of Cases				Percentage Results			
	Excel.	Good	Fair	Poor	Excel.	Good	Fair	Poor
Ether	22	29	6	1	37.9	50.0	10.3	1.8
Ephedrine	0	3	0	7	0.0	30.0	0.0	70.0
Vaccine	0	1	6	8	0.0	6.7	40.0	53.3
Ether and Ephedrine	4	7	4	0	26.7	46.6	26.7	0.0
Ether and Vaccine	3	15	3	1	13.6	68.3	13.6	4.5
Ether, Ephedrine and Vaccine	3	3	3	0	33.3	33.3	33.3	0.0
*Ether and Combinations	10	25	10	1	21.7	54.3	21.7	2.3
Ephedrine and Vaccine	0	0	2	2	0.0	0.0	50.0	50.0
Cough Medicines	0	0	0	12	0.0	0.0	0.0	100.0
No Treatment	0	0	0	7	0.0	0.0	0.0	100.0
TOTAL	32	29	24	38	21.1	38.2	15.8	24.9

*The cases in this group are included under their respective combinations and are not included in the total number of cases or percentage results.

the patients so greatly that it was unnecessary for them to put forth more resistance as was shown by the second leucocyte count. The reduction in white cells paralleled the clinical improvement of the patients. Magliano[20] feels that rectal ether is useful as a preventive measure. In this series of cases, prevention was attempted on three occasions by the use of rectal ether; two cases failed to contract pertussis even when constantly exposed, while one infant developed a fairly severe case.

The favorable results from rectal ether are probably due to the antispasmodic action of that drug caused by its slow excretion into the pulmonary alveoli and the constant bathing of the respiratory mucous membrane with a weak solution of ether. Ether *per rectum* shortens the course of pertussis and greatly ameliorates its severity. It is more effective during the paroxysmal stage and among children over one year of age. White and differential blood counts and isolation of the Bordet-Gengou bacillus, along with the signs and symptoms of the suspicious cough, are very helpful and simple aids in arriving at an early diagnosis of pertussis. Compared with the other usual methods, the writer found rectal ether by far the best form of treatment and the one that gave the most consistently good results. While rectal ether is not looked upon as a specific for pertussis, its effectiveness from the standpoint of symptomatic relief, justifies its consistent use until a better form of treatment is found and proven superior.

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DISCUSSION (*Abstract*)

Dr. Horton Casparis, Nashville, Tenn.—I think Dr. McGee is right in his attitude towards pertussis vaccine. We have not yet any definite proof of the value of pertussis vaccine, used either prophylactically or therapeutically.

Any methods which may give relief to the child with whooping cough should be used, provided they are harmless. The use of ether even in the presence of bronchial pneumonia is changing our attitude concerning the use of ether in respiratory infections in general. In other words, I think ether administered during a respiratory infection is of much less danger than was previously thought.

Dr. D. Lesesne Smith, Spartanburg, S. C.—I think any man who recommends or sanctions a cure for whooping cough shows a good deal of moral courage. We have seen treatments come and go and come and go.

I have been using ether and oil injections for the past year and a half. They have proven very efficacious in my cases, probably the best we have had in the long lists of remedies recommended. The method that I have adopted is to use a 10 c. c. test tube, and place a strip of adhesive around it at the 10 c. c. mark, then measure 2 c. c., instruct the mother to fill the tube with the oil up to the first adhesive strip, fill it up to the second adhesive strip with ether, shaking it violently, and then with a small syringe inject it slowly into the lower bowel. This will prevent any accident, as the oil and ether separate when we have it mixed in one large bottle. I have abandoned the use of pertussis vaccine in acute cases of whooping cough, although I still think it is valuable as a preventive.

The blood count is of much value in diagnosis, but it is not infallible. I have been fooled by it on more than one occasion. However, I think it is of sufficient value for us to recommend it to all of our patients when we are in doubt as to the diagnosis.

Dr. James B. Stone, Richmond, Va.—My interest in the use of ether in whooping cough was aroused several years ago, when I had a patient about five years old who, at the height of the whooping cough, developed a very acute appendicitis. The child was operated upon under ether anesthesia. The appendix proved to be gangrenous. The child had an uneventful recovery and the whooping cough, instead of being made worse, seemed to improve.

My impression has been that ether by rectum is a very valuable measure in the treatment of whooping cough, although I have not tabulated my results. I think a disease that causes such distressing symptoms, and is so often serious in infants and young children, should be given any treatment that offers a reasonable promise of benefit, without the possibility of doing harm. We need to be careful in evaluating our results from any new treatment and wish to avoid bringing any useful measure into disrepute by over-enthusiasm; but, at the same time, if such a new method of therapy seems to do good we should use it. The cases in which I have used rectal ether were those which had severe paroxysms.

My impression is that the paroxysms were made less severe and the course of the disease shortened by the ether treatments. I think the method is well worth using.

Dr. McGee (closing).—The white and differential blood count may fool us at times, but so far I have been fortunate with it. I had no other means of making an early diagnosis and used the blood count, realizing that I had nothing to lose and possibly much to gain.

The dose of ether and olive oil used did not appear to be toxic, and in one instance an ounce instead of a dram dose did not prove deleterious. Equal parts of ether and olive oil gave the best results.

With reference to what Dr. Stone said about general anesthesia helping a case of whooping cough, I might mention that Bedo reported two such cases in 1925. He remarked that it opened his eyes and, although it might not be a curative measure, it gave such excellent symptomatic relief that he felt it worthy of trial in whooping cough.

Rectal ether should be given a thorough and fair trial, and although the results are only of a symptomatic nature, in my hands they surpass those obtained by other methods of treatment.

THE IMPORTANCE OF ROUTINE MUSCLE TESTS*

By WILLIAM O. MARTIN, JR., M.D.,
Atlanta, Ga.

In presenting a paper on the diagnosis and treatment of ocular muscle imbalances I am aware that it is a subject that has been frequently discussed. Many oculists are of the opinion that even when a correct diagnosis of a muscle imbalance is made, there is little to be done. In part, this latter thought is true, but in many cases permanent relief can be given and many other patients may be made comfortable. With this idea in mind, I ask your indulgence in a general consideration of routine eye muscle tests and their interpretation.

I have found that Dunnington's classification best suits my needs and it is here presented in a modified form.

The tests are as follows:

(1) Muscle balance at 20 feet.
  (A) Screen and parallax test.
  (B) Maddox rod.
  (C) Phorometer.
(2) Prism divergence at 20 feet.
(3) Muscle balance at 13 inches.
  Same tests as used at 20 feet.
(4) Near points of convergence and accommodation.
(5) Prism convergence at 20 feet and 13 inches.
(6) Motility.
(7) Diplopia.
  (A) Prism. (B) Tangent screen.

The limits of normal are:

(1) Near point of convergence 50-100 mm.

*Read in Section on Ophthalmology and Otolaryngology, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

(2) Prism divergence 4°-9°.
(3) Prism convergence 15°-25°.
(4) Hyperphoria 0-½°.
(5) Exophoria D=0-2° N=0-5°.
(6) Esophoria D=0-2° N=0-2°.

The phorias may be divided into vertical and lateral deviations, and the latter subdivided into divergent and convergent.

There is little difficulty in diagnosing the vertical deviations with the phorometer in most cases. However, in cases of latent hyperphoria one eye must be occluded for 24 hours to bring it out.

The lateral deviations are not so easily determined. One sees in both the convergent and divergent anomalies cases of excess and insufficiency and a differential diagnosis can be made from the following:

(A) Divergence excess.
  (1) Marked exophoria for distance.
  (2) Excessive prism divergence.
  (3) Normal near findings.
(B) Divergence insufficiency.
  (1) Marked esophoria for distance.
  (2) Subnormal prism divergence.
  (3) Normal near findings.
(C) Convergence excess.
  (1) Normal distance findings.
  (2) Marked esophoria for near.
  (3) Close near point of convergence.
(D) Convergence insufficiency.
  (1) Normal distance findings.
  (2) Marked exophoria for near.
  (3) Remote near point of convergence.

The symptoms of heterophorias are numerous, and often vague, such as pains in the back of the neck and photophobia, but the most common are asthenopia and headaches. There is often a history of frequent changes of glasses without relief. The symptoms may have come on or have been exaggerated following a recent illness or debilitation.

The causes are likewise numerous and often indefinite. They may be primary or secondary. Under the former we may include errors of refraction, conditions causing general nervous or systemic depression such as convalescence from an illness, and focal infections or a combination of these. Under the latter, one finds one phoria resulting from another phoria, for example: divergence excess may follow convergence insufficiency. There is another cause which must be borne in mind and that is impaired or inhibited nerve stimuli which may be either central or peripheral.

When considering the treatment one must try to remove the cause if possible. Errors of refraction should be first corrected, foci of infection removed and rest of the eyes with out-of-door exercise. The vertical deviations of small degree are amenable to treatment by prisms. It has been my experience that prisms are rarely beneficial in the lateral deviations, although in some isolated cases they have proven satisfactory. Prismatic exercises are often satisfactory and I believe should be tried in every case. Other clinicians are at variance in their opinion as to the efficacy of this treatment.

When all other measures have failed and the symptoms are of such severity to warrant it, operative interference must be resorted to. The condition in which I find operative interference most often necessary and efficacious is divergence excess, and the operation of choice in my hands is a recession of one or both external recti, depending on the amount of exophoria to be corrected. I prefer this to a tenotomy because the muscle remains attached to its new insertion and does not re-attach at its original insertion as is often the case when a tenotomy is done. Besides, in a recession the muscle may be graduated, depending upon the degree of error, whereas in a tenotomy it cannot.

In cases of spasm of the inferior oblique which produces symptoms of such severity as to warrant an operation, a tenomyomectomy of 8-10 mm. often gives great relief.

Cases of convergence insufficiency are easily diagnosed but difficult to correct. Convergence exercises, with and without prisms, are often disappointing in the results obtained. Overcorrected hypermetropia and undercorrected myopia may be contributing factors. In the severe cases after all other measures have failed a resection of the internal recti muscles sometimes gives some improvement, but one should be slow to resort to operative interference, especially in this type of heterophoria, lest the condition be made worse. Conservatism is usually best, reserving surgery as the court of last resort. Might there not be a convergence center which is at fault in some cases? Certainly there is evidence indicative of one.

Cases of convergence excess when accommodative in origin may be relieved by full correction of the hyperopia if present. By doing this we sometimes prevent an esotropia from developing.

Two recent cases of muscle imbalance are illustrative:

Case 1.—A young woman complained of constant headaches. She had been refracted several times within the previous six months and had been exhaustively studied by good internists with negative findings. Her refraction under homatropine cycloplegia showed a + 0.500 sphere in each eye which she was wearing. There was no muscle imbalance except a variable amount of hyperphoria of about ½-¾ for near. One eye was occluded for 24 hours and a latent left hyperphoria of 1½ was brought out. A half degree prism was given in each eye with immediate and complete relief of symptoms.

Case 2.—A girl, aged twenty years, came complaining of headaches and asthenopic symptoms. She had been forced to discontinue college work during her senior year. Her refractive error was negligible and her physical examination revealed nothing wrong. She had a divergence excess and a convergence insufficiency as evidenced by a marked exophoria for distance 24° and 20° for near, with a near point of accommodation of 20 cm. In addition there was a right hyperphoria of 2°. Because other measures had failed and because of the severity of the symptoms, operative interference was deemed advisable. A recession of the external rectus of 5 mm. was done on the right eye and two weeks later the same was done on the left. The immediate result showed 6° exophoria for distance and 4° for near with no hyperphoria. Examinations at monthly intervals showed a decreasing amount of exophoria and at the end of six months there was 3° esophoria for near and 1° exophoria for distance with no hyperphoria. She has been entirely relieved of headaches, and can use her eyes for moderate work without difficulty and is back in college working for her degree.

CONCLUSIONS

(1) Routine muscle tests are important.

(2) Diagnoses of muscle imbalances are not difficult.

(3) Many cases can be given permanent relief and others can be made more comfortable.

DISCUSSION (*Abstract*)

Dr. William Y. Sayad, West Palm Beach, Fla.—Probably the most neglected and the most tedious of the routine work is the examination of the external muscles of the eye during the regular refraction.

I wish to dwell on the causative factors that bring about the asthenopias and slight impairment of function of the extra-ocular muscles, as well as the impairment of accommodation.

A large majority of the cases of ocular disturbance due to muscular imbalance are caused by disturbance of physiological functions. Often we find asthenopia among women, either before or after labor, when their vitality is more or less depleted. We find it among patients convalescing from an exhaustive illness.

However, the most outstanding cause in my experience has been focal infection, particularly in teeth, tonsils, sinuses, and intestines. A routine muscle test, before and after the foci of infection have been removed, will reveal that the slight muscular imbalance which had been giving annoying symptoms is remedied.

Muscular imbalance can be caused by focal infection, in varying degrees of severity even to the point where the muscle is almost paralyzed.

There are selected cases of muscular imbalance which can be improved by prismatic correction or operative procedures, and the latter method should be resorted to when everything else has been exhausted. However, in many cases a thorough refraction with improved correction, proper muscular exercises, and, above all, an improvement of general hygienic and systemic conditions should be considered.

Dr. Clifton M. Miller, Richmond, Va.—Lately we have found some cases of muscle imbalance complaining of pain in the back of the neck, and if you go into the nose high up and cocainize over the area and reach the sphenopalatine ganglion, you can relieve the pain almost instantly, although it is difficult to differentiate eye refraction pain in a perfectly corrected person from muscle imbalance. Then we also have to deal with focal infection in the sinuses, posterior ethmoid and sphenoid, in correcting the condition.

I want to differ absolutely from the doctor about the rarity with which eso- and exophoria can be aided by prisms. I agree with him on the subject of focal infection, and general care of the health, and as to the frequency with which a pregnant or recently delivered woman will recover from the condition.

Old Dr. Gruening used to say, and as you know there was no better observer in this country, that the most brilliant results he got in his refractive work were from the prescription of weak prisms for low degrees of esophoria, and I find the same thing. I believe in prisms for the correction of the lateral phorias.

Dr. M. L. Dillon, Charleston, W. Va.—It has been my teaching and practice not to prescribe a prism of more than 4° for vertical phorias due to interference from spectral colors produced by high prisms. This of course does not apply to actual tropias which produce diplopia.

The importance of muscle testing can not be emphasized too much in refraction. If I did not do a routine muscle test I would not feel that my refraction was complete.

The essayist seems to think very little of prism exercises. We feel that we get good results from prism exercises in practically all patients up to twenty years of age; beyond thirty our results have been so poor that we have discontinued the use of prism exercises entirely.

The phorias, vertical and lateral, must be treated differently.

Prism exercises in vertical phoria I have not used. I have records of a number of patients with from ten to sixteen degrees lateral phoria who with prisms exercise have recovered normal muscle balance and perfect comfort. In high lateral deviations the use of correcting prisms has been of no service to me except in presbyopes and then mainly for near work.

Operation particularly for phorias is a very delicate procedure and should be used only by a man who is an expert with his operative technic. If you feel you are not an expert by all means refer your operative muscle cases to some one who is.

Dr. Oscar Wilkinson, Washington, D. C.—The man who opened the discussion stressed a very important point, the general care of these patients. In a number of cases I have seen an exophoria disappear when the general physical condition of the patient was brought to normal. That should never be forgotten.

I want to thank Dr. Miller for bringing out the

point of differential diagnosis of headache by the use of cocaine applied to the posterior nasal region. If you plug both nostrils in ethmoid cases the patient is often relieved in twenty to twenty-five minutes.

It has been my observation that the headache from exophoria and hyperphoria is very frequently occipital; the headache from errors of refraction is more frequently over the temporal or frontal region.

I think we all agree as to the beneficial effect of prisms in hyperphoria. I have never seen them do any harm and I have seldom seen a case in which they did not do good. They give very marked relief. I have never used prisms in esophoria. In those cases we should increase the amount of the plus glass. The use of prisms does not do a great deal of good in exophoria in children, but in patients from forty to fifty years of age they are of decided advantage. In other words, the prism is best in hyperphoria, and next best in exophoria.

Dr. Bascom H. Palmer, Jr., Miami, Fla.—I will read again the title of Dr. Martin's paper: "The Importance of Routine Muscle Tests." We all treat a case one way at one time, and at another time the same kind of case with a different prescription. Too few men who are doing ophthalmology are making routine, careful, exhaustive muscle studies. Most of them hold up a finger, have the patient look this way and that, and that ends it. In an ophthalmologist's office, if you do not see at least a Maddox rod, a spot light, a perimeter, and a tangent screen, you have a right to suspect that he is not making careful routine muscle examinations.

I had the opportunity of being associated with the research laboratory of the Air Service of the Regular Army for several years during the War. There very careful routine examinations of muscle cases were made. It was costly to the Government, but it was a necessary thing. Dr. Sayad said that the exophoria increased at different times, depending on the physical state. In the Army it was a requirement that a flier have not more than ½ prism diopter of hyperphoria, and not more than 2 of exophoria, and not more than 3 or possibly 4 of esophoria. Many times we have found some of the crack fliers of the Service, normal when they were in good condition, within the limit of 2 prisms exophoria. But, as you know, in those days the flying personnel was rather reckless. When they were not on duty they were carousing around, and when they came back to go on duty they were immediately ordered to the laboratory for examination and almost always we found muscle deviation.

Another thing found in several thousand tests was this: that a very definite relationship existed between the muscle imbalance and the depth perception or parallax. Men who are flying airships must have excellent depth perception, so if the motor fails they will be able to say whether one landing field is smoother than another. We found a definite relationship between the exophorias and depth perception.

Dr. H. J. Blackmon, Tampa, Fla.—I should like to emphasize one point mentioned by Dr. Miller, the examination of the nose in cases of symptoms of asthenopia. It is surprising how often these symptoms are due to a deviated septum with sinus involvement, when the eye findings are normal. These cases are relieved temporarily by shrinkage and suction or permanently by a submucous resection.

I have always been interested in the use of the Duane tangent screen in diagnosing the muscle involved in a diplopia. The patient is made to look in the six cardinal directions. In the horizontal movements the horizontal separation of the images is considered and in the up and down directions, the vertical separation of the images is the determining factor. Spasm of any muscle gives the same field as paresis of its associated antagonist and they are differentiated by the ocular movements.

Dr. Martin (closing).—As Dr. Blackmon says, it is essential that we know the actions of the extrinsic muscles in the six cardinal fields of gaze. We must keep in mind in plotting our muscle fields that the deviation of the false image increases in the field of action of the paralyzed muscle: that is, it goes in the direction the affected muscle fails to go. As a general rule a crossed diplopia means that an oblique muscle is affected and a homonymous diplopia means a lateral rectus, although this is not always the case.

The etiology of muscle imbalances is obscure, but I am convinced that neurasthenia plays an important part, probably as much as infection. Small errors in the neurotic, high strung individuals will produce symptoms, whereas the same errors may not in the plethoric type. I believe there is some psychic effect in prescribing prisms in the lateral deviations and for this reason I prescribe them in exceptional cases, but find most cases are made worse by prisms, except in the hyperphorias. Prisms do have a distinct place, however, in vertical deviations and I frequently prescribe them.

I have enjoyed the discussion because it indicates to me the increased importance which is now being attached to careful muscle testing.

ENCEPHALITIS AND ENCEPHALOMYELITIS FOLLOWING VACCINATION AGAINST SMALLPOX: REPORT OF FIVE CASES*

By C. S. Holbrook, M.D.,
New Orleans, La.

Because of the apparent increase in the frequency of involvement of the nervous system by the viruses of the exanthemata, I wish to present the following case histories. The five patients who form the basis for this report were all considered perfectly well prior to the onset of the illness described and they all presented evidence of successful vaccination with Jennerian vaccine.

Case I.—Mrs. W. R. G., a white woman twenty-six years old, was admitted to the service of Dr. Rudolph Matas at Touro Infirmary, New Orleans, March 20, 1928. I was called in consultation shortly after her admission.

She complained of paralysis of the lower extremities and loss of vision in the right eye.

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*Read in Section on Neurology and Psychiatry, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

This patient was apparently perfectly well until ten days before admission, when she had what was considered "a bilious attack," a gastro-intestinal upset. This was mild and the symptoms soon disappeared, but two days later she began to have numbness and tingling in the lower extremities. This was one week before her admission to Touro Infirmary. Two days after this her bowels failed to move without an enema. On the third day her bladder became affected and she was unable to void. In the meantime her lower limbs gradually grew weaker and became anesthetic. On the fourth day she was still able to walk, but had little control over her legs. Next day she could not walk without support. Later that day she was unable to walk, but could still move her legs in bed.

On the third day of the illness (after the numbness and tingling began) the vision in the right eye became blurred and gradually grew more dim until on the date of admission she was totally blind in the right eye. Vision in the left eye was greatly impaired.

The left arm during the second or third day became completely paralyzed. This condition was preceded for several days by sensations of numbness and tingling. The right arm was weak, but all movements were possible. The speech had been slightly impaired. There was weakness of the right lower face.

This patient had had the usual diseases of childhood and also typhoid fever many years previously. Sixteen years before she had had a salpingo-oophorectomy. About six years previously she had a fall and injured her back, but is said to have made a perfect recovery from this accident.

Three weeks before admission she was vaccinated against smallpox. This resulted in a "take." At the time of admission to the hospital there was present a pustule with beginning crust formation. The vaccination sore gradually healed after running an average course. The mother of this patient stated that the patient was vaccinated twenty years before.

Examination showed an adult white female about forty years of age who appeared restless and apprehensive. She could move only her head and right upper extremity. The head was normal in shape and contour and showed no evidence of injury.

Dr. Henry Blum, consulting oculist, examined this patient on March 22, and reported:

"Both eyes show limitation of movement upwards; the pupils appear immobile. The right eye shows elevation of the nasal edge on the nerve head with engorgement of the retinal veins. In the left eye the optic disc shows a little loss of transparency of the nasal edge, with limitation of the upward visual field and complete loss of vision in the right eye.

"These findings, associated with increased intracranial pressure and with paraplegia and weakness of the arm muscles, suggest a diffuse encephalitic process.

"March 24, both eyes show more edema of the optic nerve. Now the right nerve head shows distinct swelling and the left nerve head shows edema of the disc and blurring of the edges. The right pupil does not react to light. The left pupil reacts sluggishly."

The ears and nose were normal, the throat was essentially negative, the tongue protruded in the midline and moved properly in all directions. There was a fine tremor. The lower half of the right face showed definite weakness. The neck was negative. A nasal feeding tube had to be passed because of inability to swallow.

The abdomen was negative except for a small, round, firm tremor felt in the lower right quadrant. There was no pain or tenderness on palpation of this mass.

Complete paralysis with loss of all sensation was present in the lower extremities. The paralysis and anesthesia extended to the third dorsal segment of the cord.

The arms were both weak; the left was much weaker than the right. The neurological picture was that of a complete transverse myelitis at the level of the third dorsal segment with a less degree of involvement in the upper dorsal and cervical cord.

Excerpts from Progress Notes.—March 21, spinal puncture showed clear fluid. Pressure on the jugular veins caused a prompt rise in the manometer of 10 to 12 mm. of mercury; cells were 21 to 22; globulin one plus; Wassermann negative; colloidal gold 0012333210. The temperature was 100 to 101°; pulse 110 to 130; respirations 20. There was weakness in the right lower face and a tingling in the right face, especially about the lips. The patient stated that she noticed much more difficulty in controlling her tongue and talked more indistinctly.

March 22.—The left arm was completely paralyzed, but there was no disturbance in sensation in the arm. Tingling in the tongue was present and increased difficulty in controlling the tongue. The temperature was 101-102°; pulse 100, and respiration 20.

March 23.—She mistook people in the room because of poor vision. The right disc showed more engorgement and more swelling, and near the nasal branch of the inferior retinal vessel there appeared to be a little ecchymosis. The left disc was slightly more swollen than on the previous day. Pupillary response was absent in the right eye and sluggish in the left. Apparently there was an obliteration of the upper field in the left eye. She counted fingers at twelve inches. There was tingling in the face and tongue and the tongue deviated slightly to the left. She spoke better, or at least as well, as on the previous day, and was mentally clear.

Spinal puncture showed pressure of 10 mm. of mercury; pressure on the jugulars gave a prompt rise of 4 to 6 mm. of mercury. Cells were 74 to 75; globulin two plus; the Wassermann was negative; chlorides 730.8; dextrose 57.5, and cultures were negative. The temperature was 102 to 103°; pulse 110, and respiration 20.

March 24.—The patient complained of pain in the neck, which was decidedly stiff. The limbs were flaccid. There was no sensation below the third dorsal segment. The line of demarcation had not changed since admission. She was unable to move the left arm. Sensation in the left arm was not disturbed. The right arm was weak; otherwise normal. She counted fingers at twelve inches with the left eye; there was no vision in the right eye. Swelling of the optic discs was pronounced. The patient was drowsy and slept when she was not disturbed. Her temperature was 104.4°; pulse 100 to 110; respiration 20.

March 26.—She had complained in the night of pain in the head and of general discomfort and slept but little. Difficulty in swallowing developed. She said that she could not control her tongue to get the food in the back part of her mouth. She could take only fluids. She was unable to open her mouth fully, and moved her tongue with much difficulty. Speech was

indistinct. Sensation in the arms and face were normal. Swelling of the discs was more marked.

Spinal fluid was 800 cells; globulin, three plus; colloidal gold 0000112223; dextrose 38; smears were negative. Her temperature was 102 to 103.4°; pulse 98; respiration 20.

March 28.—She was growing weaker and weaker; her general condition was much worse. She slept much of the time, was unable to move her head, and talked with difficulty. Her temperature was 102 to 103.5°; pulse 90 to 100; respiration 30 to 35.

March 29.—There was marked lateral nystagmus.

Spinal puncture showed cells 80; globulin two plus; Wassermann negative; colloidal gold 1210012221; chlorides 695.7; dextrose 50. Her temperature was 102 to 103°; pulse 90; respiration 25.

March 30.—There was practically no voluntary movement. She was unable to move either arm, could not turn her head, speech was very indistinct, and she could not protrude her tongue. Respiration was limited. She was drowsy and slept at intervals. She recognized those about her by their voices. She could see very little. She was unable to open her eyes and asked that her lids be held open. The temperature was 105°; pulse 100 to 110; respiration 25.

April 1.—Yesterday afternoon the patient was deeply comatose and had pulmonary edema. She appeared to be in the throes of death. When I saw her at 8:00 p. m. it was my belief that she could not live through the night. This morning she was conscious, though mentally clouded. She recognized people by their voices. Her temperature was 103°; pulse 80 to 90; respiration 20 to 25.

April 4.—Several times during the past few days it appeared as though she could live but a very short time. She recognized me and spoke to me by name. There was complete paralysis of all the muscles of the trunk, neck, upper and lower extremities. The eyes were usually fixed to the left. When they were moved to the right there was nystagmus. Decubitus ulcers were beginning to appear in spite of precautions. Her temperature ranged from 102 to 106°; pulse was 90; respiration 20.

April 6.—She was clearer mentally; respiration was embarrassed, and the pulse had little volume. Vision in the left eye was fairly good for her. She recognized those about her.

April 9.—Her condition during the preceding few days had changed but little. At the request of the family she was allowed to leave the hospital and return to her home in a small town in Mississippi. It was thought that she could not live over a few days. A nasal feeding tube was left in position, so that she could be nourished. Her temperature during the preceding week had varied from 101 to 104°; her pulse remained in the neighborhood of 90; respiration 25 to 30.

Upon admission she had a leucocytosis of 10,000, with 83 per cent neutrophiles; 12 per cent small mononuclear lymphocytes, and 5 per cent large mononuclear lymphocytes.

The urine was essentially negative on three examinations.

Communications from the family and Dr. S. E. Dunlap, of Wiggins, Mississippi, apprised us that she had slowly improved after leaving Touro Infirmary. She was readmitted for examination July 26, 1928. The improvement had been gradual. She was able to take nourishment without the tube. She soon began to move the fingers, then the hand, and then the forearm, so that upon readmission she could lift both hands to her nose. The paralysis from the third dorsal segment was complete. This was associated with total anesthesia and was the picture of a transverse destructive lesion of the cord.

She complained of a disagreeable ringing in her ears and excessive secretion of saliva dropping back in the throat. Pain in the neck and a drawing pain in both arms and around the upper chest proved very distressing and at times required morphine.

Examination showed a well developed and flabby white woman paralyzed in the trunk and lower extremities, who was mentally clear. Her temperature was 98°; pulse 80; respiration 20; blood pressure 80. The pupils were regular, equal and reacted to light and accommodated. There was no nystagmus or muscular imbalance. The vision was good; she was able to read without glasses. The tongue protruded in the midline and moved in all directions. There was no tremor and no disturbance in the muscles or sensation of the face. Speech was normal. Sensation was normal to the third dorsal segment. Below this line was a complete absence of all types of sensation. All reflexes of the trunk and lower extremities were absent. A healing decubitus ulcer was present in the sacral region, 3 inches in diameter and 2 inches deep. The edges appeared healthy. Atrophy was present in the limbs, and especially present in the small muscles of both hands. The skin over the hands was tense and shiny. On August 30 the patient was discharged. This patient lived through the winter and spring and died May 8, 1929. The exact nature of the demise was not determined, but it was the result of the myelitis.

Case II.—A little white girl aged five years was admitted to the service of Dr. Frank Hardenstein at the Southern Baptist Hospital in New Orleans September 30, 1928.

The complaint was of somnolence and paralysis of the lower extremities.

Previous history indicated a normal birth and development. She had had influenza and bronchopneumonia in 1925, and she had had whooping cough, measles and mumps, with no complications.

On August 27, 1928, at the age of five, the child was vaccinated against smallpox. This resulted in a successful "take" and the vaccination proceeded in the usual manner until September 6, when she was listless, did not sleep, vomited in a projectile manner, was dizzy at times and lay down.

On September 7 she appeared ill, was very limp and took no interest in anything. She would not initiate conversation, but answered questions very indistinctly. Late that day she could not talk. This aphasia lasted four days. From the commencement of her illness (September 6) she was unable to walk. This condition persisted until she was admitted to the Southern Baptist Hospital September 30. At this time she was completely paralyzed and had no sensation in her limbs. The bladder and bowels were incontinent.

Shortly after she became sick she was somnolent. This deepened until she slept except when stimulated. Finally, she was so deeply unconscious that she could not be roused. Coma persisted for four days; then

there was a gradual lessening of the clouding of consciousness.

Upon admission to the hospital this note was made: "The patient is a little girl of five years, lying quietly in bed, somnolent, noticing nothing, waking only to take food and going immediately to sleep. It is said that she has been thus for four days. The pulse is strong and regular, the rate 140; temperature is 102°. The eyes move but little and there is an external strabismus (recent). The pupils are dilated and react sluggishly to light and accommodate. The head is drawn backward. The neck and back muscles are stiff. The child cries with pain when moved. Kernig's sign is positive; the Babinski is negative. The heart and lungs are negative, as are the ears, nose and throat. The lower extremities are paralyzed and have no sensation."

Spinal fluid examination on September 8 gave the following: cells 70; globulin one plus; Wassermann negative. The differential count was neutrophils 1; small mononuclear leucocytes 95; large mononuclear leucocytes 4. Smear and culture were negative.

September 9.—The spinal fluid showed cells 98; globulin one plus. The differential count was: neutrophils 12; small mononuclear leucocytes 88. Blood examination on this date showed a leucocytosis of 18,700; small mononuclears 28 per cent; large mononuclears 2 per cent; neutrophils 69 per cent.

September 11.—The spinal fluid showed 25 cells and on September 12 only 10 cells. On September 14 the cells were one or two with a slight trace of globulin.

Her temperature upon admission to the hospital was 102°, but it rather rapidly approached normal or slightly above normal. The pulse upon admission was 104°. In a few days it was as low as 90 and its rate remained near this point except for a few days during the latter part of September, when it was 110 to 120 for several days. The cause of this was unknown.

The patient was allowed to go home September 30, 1928, after a stay in the hospital of twenty-one days.

Dr. Hardenstein presented this child at the October meeting of the Staff of the Southern Baptist Hospital. This was the first opportunity I had of seeing this patient. She appeared to be practically fully recovered except for a little difficulty in walking.

On October 9, 1929, thirteen months after the onset of the acute illness, this patient came to my office.

The mother stated that the child did not walk well, that the knee was hyperextended and the gait unsteady. Since her illness she has had very little control of her bladder. She wets the bed at night and frequently wets her clothes in the day. She is able to hold only a small amount of urine in her bladder and when the impulse to micturate is perceived she will wet herself if there is not a toilet readily available. Before her illness of a year ago she had no such trouble. Mentally this child is bright and has no conduct disorders.

Examination shows a well developed girl of six years who stands with knees slightly fixed and hyperextended and who is wearing wet underclothes as a result of incontinence of urine.

The pupils are equal and react to light. The muscles move the eyes normally. The fundi are normal. There is no nystagmus. The teeth are in good condition. The tongue protrudes in the mid-line and moves well in all directions.

The face is symmetrical and there is no evidence of disturbance of any of the cranial nerves. The biceps reflexes are very lively and coordination in the upper extremity is good. The strength appears normal for a girl of her age.

The patella reflexes are extremely lively and equal. There is no patella clonus. There is a double Babinski, more marked on the right side. The Gordon is positive on both sides. There is no Oppenheim reaction and no Kernig. The abdominal reflexes are equal and moderately active. There is no disturbance in sensation anywhere.

I take this opportunity to thank Dr. Hardenstein and Dr. Rena Crawford for permission to present this history.

Case III.—A white boy of four and one-half years, born in New Orleans, but living in Santo Domingo, was admitted to the Southern Baptist Hospital, New Orleans, September 29, 1929. He was in the service of Dr. James E. Bailey, to whom I am indebted for permission to present this case history.

About two weeks previous to admission this patient was vaccinated on the left arm against smallpox. On September 27, fever of 101° was found to be present. There was also severe but dull headache. There was nausea and vomiting. He slept very little that night.

The next day the fever was still present and the headache was more severe. Once he threw himself out of bed, complaining of his head. He vomited several times. The emesis was not projectile in nature. He cried practically all day long and held his neck as if it hurt him very much. It is stated that this child had some frequency of urination and each urinary act seemed painful because he cried whenever he emptied his bladder.

The previous history was not unusual. He was a full-term child, of normal delivery, breast fed for five months. He had made normal progress in growth and development. At eighteen months, he had a gastro-intestinal upset. At three years he had whooping cough. He had had no other serious illness, accident or operation.

The father, an American, was living and well. The mother, a Santo Domingan, was living and well. One sister was living and well. There was no tuberculosis or cancer in any close member of the family.

Examination showed a well developed and well nourished child of four and one-half years. The head was apparently normal, the neck stiff and painful. The head and chest were normal. The abdomen was not tender or rigid and appeared normal. The extremities were normal in development. There was a positive Kernig, but there were no other abnormal reflexes.

Laboratory Findings.—The urine was normal on two occasions. Blood showed 4,640,000 erythrocytes; hemoglobin 85 per cent; leucocytes 9,500; small mononuclears 27; large mononuclears 7; neutrophils 66. Spinal fluid September 29 showed pressure 30 mm. of mercury; 28 to 29 cells; globulin not increased; Wassermann negative; colloidal gold showed no reduction. The smear showed 100 per cent lymphocytes and no bacteria.

Upon admission to the hospital the temperature was 101°. The next day it rose to 103.4°, after which it did not rise above normal. The pulse during the first two days fluctuated between 110 and 90. The latter rate was maintained with little fluctuation until the

patient was discharged. The respiration was not unduly rapid.

On the second day after admission I was asked to see the patient. At that time he was stuporous, his neck was very stiff, the Kernig was markedly positive. The fundi were negative. The eye muscles functioned normally. The left arm showed a healing vaccination. The picture was that of a meningeal irritation associated with encephalitis.

On October 3, a note in the progress record stated that the patient was much improved. The stiffness of the neck had almost disappeared. He complained of the sensation of mosquitoes biting him along the spinal column.

He was discharged October 6, much improved. He appeared to be feeling normal. Muscular rigidity had practically disappeared.

At my request he was brought to my office for examination on November 5. The parents stated that since the child had gone home he had very promptly improved and regained his strength, and they were of the opinion that he was as bright or brighter than before.

Examination showed a child that appeared normal in every way. The most careful physical examination elicited nothing abnormal. It is considered that his recovery is complete.

Case IV.—I am indebted to Professor John H. Musser, of Tulane University, for permission to report the following case, which was received by his service at Charity Hospital, New Orleans, September 9, and discharged from the same institution ten days later.

T. S., a white girl of seven years, lived in the outskirts of New Orleans. Her complaint was fever, hypersensitiveness, stiffness of the neck and back, paraplegia, incontinence of feces and urine, and an enlarged left axillary gland.

The present illness began six days prior to admission, following a vaccination for smallpox three weeks before. She had been perfectly well previously. The illness began with chills and fever, which subsided in a few days. Several days later they recurred with incontinence of feces and urine. Three days before admission the patient suddenly became worse. Her eyelids drooped, she was drowsy and cried at intervals, had stiffness of the neck, hyperesthesia with paralysis of the legs and incontinence of the urine and feces.

She lay on her back with the head twisted to one side. The neck was rigid, as was also the back. On the left arm was a three weeks vaccination pustule. There was paraplegia involving the legs, a positive Kernig, Babinski and Brudzinski.

Spinal fluid examination upon admission September 9 showed 100 cells; globulin was 4 plus; Wassermann negative; dextrose 112. Smears and culture were negative.

September 13 cells were 44; globulin was increased. Smear and culture were negative.

A note was made that the spinal fluid was distinctly bloody upon three occasions.

She had slight fever to 100° on admission, none afterwards, and she improved markedly after spinal punctures. When discharged she had only a slight weakness in the legs.

A report from Dr. J. L. Locasio two months after she left the hospital states that the child appears to be entirely well, except for a very slight ptosis of the right eyelid.

There is no doubt that the nervous system, affected by the virus of vaccination, is subject to various degrees of involvement. Thus, encephalitis may be so extensive and malignant that death ensues promptly. Again, there may be actual destruction of the cord or extensive areas in the brain resulting in residuals which vary greatly in extent. There are other cases presenting definite pictures of involvement of the cerebrospinal system, which recover completely after a comparatively short illness. The lesser involvements may be so mild or so transient that their true nature is not recognized. The following case is presented as an example of a very mild reaction. I fully realize that there may be some question as to the actual relation to vaccination and am willing to admit that this relation cannot be easily proven and possibly does not exist.

Case V.—S. T., a white boy of five years, was admitted to the service of Dr. Rena Crawford at the Southern Baptist Hospital, New Orleans, October 17, 1929, and discharged October 21, 1929.

He complained of partial loss of the use of the left arm and attacks of weakness in the left arm and leg. On October 14, while crossing a footbridge in front of his home, the patient fell into the ditch and had to be lifted out. Two days later, while his mother was giving him his bath standing, his left leg began giving away and he fell to the floor and became rigid for three to five minutes. He did not seem to lose consciousness. The mother was very much alarmed over this occurrence and took the baby to Dr. Crawford. Nothing of importance was found.

On October 16, at 10:00 p. m., while the child was sleeping, the left arm and left face twitched so vigorously that the mother, who was sleeping with him, was awakened. The child could not talk or open his mouth. He could not move his left arm or leg. This attack lasted forty-five minutes. Recovery was gradual. This was followed by some impairment in the control of the left arm. He did not use the left arm as well as the right, though normally he was left-handed.

On September 11 this child had been vaccinated for the first time against smallpox. In about a week there was evidence that the vaccination was "taking." When he was admitted to the hospital there was present a crusted pustule which had a normal appearance.

The examination showed a well developed and well nourished boy of five who did not use his left arm and hand as well as his right. He was wide awake and played in a normal manner. The neck was not stiff. There was no Kernig or abnormal reflexes. The fundi were normal. In fact, the findings were essentially negative except for the preference given the right arm.

The laboratory examinations did not reveal any abnormalities. The blood Wassermann was negative; the urine normal; stool normal and free from parasites. The blood contained erythrocytes 3,400,000; hemoglobin

50 per cent; leukocytes 4,500; small mononuclears 26 per cent; large mononuclears 7 per cent; neutrophils 65 per cent; eosinophils 2 per cent. The spinal fluid showed no increase in cells; globulin negative and Wassermann negative.

The patient was in the hospital five days. Upon discharge the left arm appeared as strong as the right and he had again become left-handed, in that he used the left hand more than the right. A report three weeks after his hospital discharge showed that he had no further trouble and appeared as well as ever. Before this illness he had never been sick enough to have a physician treat him and had had nothing similar to the attacks of weakness or any suggestions of *petit mal* attacks.

Encephalitis and encephalomyelitis are occurring more frequently in association with or following various diseases, especially rabies and the exanthemata, such as smallpox, measles, scarlet fever and vaccinia. Much investigation has been carried out in this country and in Europe to determine the relation, if any, between the primary diseases and the secondary involvement of the neuraxis. It appears that the laboratory investigators will be occupied for a long time with this problem, because up to the present many questions are far from solved.

Levaditi and others[1] have apparently proved the identity or very close relationship of the viruses of herpes and epidemic encephalitis, or von Economo disease. A filterable virus can be obtained from patients suffering from encephalitis and passed through successive generations of rabbits. The virus obtained from lesions of herpes resulted in encephalitis when injected into rabbits. Immunity caused by either of the viruses created immunity for the other.

There appears to be little or no difference in the pathological changes of encephalitis in measles and epidemic encephalitis, but there is considerable difference between the changes in these diseases and changes observed in the encephalitis following vaccination. Dr. Simon Flexner[2] briefly states that histologically epidemic encephalitis is characterized by diffuse inflammatory changes associated with exudation of blood cells. In the post vaccinal forms, there is a wide demyelinization of the nerve tissues, so that the lesions resemble those of acute disseminated sclerosis.

The frequency of encephalitis or encephalomyelitis following vaccination cannot be determined at this time, because of the recent increase in this disease, but awakened interest in the disease is made manifest by the number of articles written on the subject. Unfortunately, the literature is so recent that it does not lend itself readily to review.

Europe appears to have been the greater sufferer and it was said that the United States was free from this disease, but this has proven not to be the case. In the Netherlands 139 cases of vaccination encephalitis were reported in the period 1923-1927. There were 41 deaths. In England and Wales 88 cases with 49 deaths occurred from 1922 to 1929.[3] In the Netherlands it is stated that for the years 1926 and 1927 one case occurred in every 2,800 vaccinations.[3]

Dr. George Blumer[4] reported the experience in Bridgeport, Connecticut. From 30,000 to 40,000 persons were vaccinated. Following this, there were two cases of encephalitis. The question of coincidence arose and it could not be definitely stated that these were not cases of epidemic encephalitis.

As far as coincidence is concerned in reference to the cases of encephalomyelitis reported in this paper, I wish to point out that there have been comparatively few cases of epidemic encephalitis in this part of the United States during the past eighteen months. In contrast to the rarity of epidemic encephalitis now, attention may be directed to the comparative frequency of this disease four or five years ago.

All of the patients presented in this report had been well previous to vaccination against smallpox, and they all showed distinct but normal evidence of successful vaccinations in various stages of development. It is my belief that these cases are not cases of epidemic encephalitis, but are cases of encephalitis or encephalomyelitis due directly or indirectly to the virus of vaccinia.

In a recent letter to the *British Medical Journal*, dated October 5, 1929, printed in the November 2 issue of the *Journal of the American Medical Association*, Dr. Myer Coplans, Col. W. G. King and Sir William Simpson, of the Ross Institute for Tropical Diseases, point out that the government lymph used in 18 of the 25 cases of post vaccinal encephalitis that have occurred in this country was a product of the vaccination of calves with lymph derived from the rabbit. They discussed further the possibility of transmission of a virus disease from the rabbit to the human, resulting in the production of encephalitis. This note is of interest and may possibly shed some light on the increase in encephalitis following vaccination which is being experienced in this country.

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DISCUSSION *(Abstract)*

Dr. Carrol C. Turner, Memphis, Tenn.—Dr. Holbrook's mortality rate is lower than that customary in post vaccinal encephalitis, which usually runs around 47 to 50 per cent. Affections of the nervous system, following vaccines of different types, have been reported for a number of years. Recent interest in post vaccinal encephalitis was given impetus in 1922 by the occurrence of 139 cases in the Netherlands resulting from vaccination for smallpox. In 1913, Richter reported a case of death from this affection, the post mortem findings of which were very similar to those of encephalitis. Ottinger and Marinesco reported a case of a man who died following smallpox vaccination in 1918. Westphal, in 1872, reported a case similar to the one reported by Eichhorst in 1902. In both of these cases the disseminations found in the cord were similar to those described in post vaccinal encephalitis.

Clinically, epidemic encephalitis and post vaccinal encephalitis are similar in course. In post vaccinal encephalitis the cord is more commonly affected, however, and therefore peripheral symptoms are more manifest than in epidemic encephalitis. Pathologically, these two conditions differ widely. In post vaccinal encephalitis the histopathological picture is almost identical with multiple sclerosis. In epidemic encephalitis the histopathological picture is that of pericellular lymphocytic infiltration without any evidence of demyelinization. In epidemic encephalitis the processes are more numerous in the gray matter, whereas, in post vaccinal encephalitis the pathological process appears more numerous in the white matter. The causes of post vaccinal encephalitis are speculative. The following have been introduced as possibilities:

(1) That there is a virus introduced with the vaccine.

(2) That there is an allergic reaction.

(3) That the vaccine stimulates to activity a dormant virus present in the nervous system, which has been introduced at some previous time.

The latter is generally accepted among students of this affection. At any rate, more cases have been reported during a mild epidemic of encephalitis. Parkinsonism does not appear to be a sequel of post vaccinal encephalitis. There has been only one case reported following involvement of the corpus striatum, which is frequently involved in epidemic encephalitis.

Dr. P. L. Dodge, Miami, Fla.—We must be careful about ascribing the cause of encephalitis to vaccination unless it is absolutely proven. We have, of course, a great many people who are opposed to vaccination, and these people, if they can possibly find an excuse not to be vaccinated, will seize upon it and cause a great deal of disturbance in the community. The mere fact that a case of encephalitis may develop following vaccination is not nearly so serious as the fact that a great many cases of smallpox may develop if we do not have systematic vaccination.

In fact, it does seem that smallpox vaccine is put up under such strict supervision and with such very great care by the various laboratories that the liability of its having any contamination that might cause encephalitis is remote. The fact that a few cases of encephalitis develop following smallpox vaccine does not seem to be particularly important, and I cannot but feel that there may be some other incidental cause in the development of these cases. We know that a great many nervous conditions do develop because of some obscure toxin in the blood, possibly from the gastro-intestinal tract. Most of these cases show gastro-intestinal symptoms which possibly might be the cause of the trouble.

It is very important to do a systematic lumbar puncture, thoroughly studying the spinal fluid. Particularly, I refer to the pressure of the spinal fluid, which is very often neglected by men who are doing spinal punctures. In every spinal puncture, whether syphilis is suspected or not, we should get the pressure of the spinal fluid. In epilepsy very little attention is paid to pressure. In all my cases I make a study of the pressure, and it has assisted me a great deal in their treatment.

Dr. William A. Smith, Atlanta, Ga.—It is an interesting fact that no cases of this type have been reported in children vaccinated for the first time under two years of age. This is a very strong argument for vaccination before the child is two years of age.

Dr. R. McG. Carruth, New Roads, La.—I have had no experience with any of these sequelae. In my section there is no prejudice against vaccination. We have had a number of outbreaks of smallpox and people have paid dearly for the lessons they have learned. But I do wish to say that I think all untoward results of vaccination should be promptly reported. It was Herbert Spencer who said: "If a man think that he knows a thing, and say it, whether he be right or wrong, he doeth well. For if he be wrong, the world will show him his error; and if he be right, he will, in time, bring the world to his view, so that good will have been done." There are many individual idiosyncrasies and I have always held that in any kind of vaccination, except in direst emergency, the patient should be prepared just as for an operation and all unusual effects should be made a matter of record.

Dr. Holbrook (closing).—Those of us who saw these cases felt that they were not due to the epidemic encephalitis which we saw a few years back. The picture was not quite the same. We have seen no recent cases of epidemic encephalitis in this community.

Of course, it has been well recognized that sporadic cases of encephalitis associated with measles and other exanthemata have been reported. The first case of encephalitis and measles was described in 1886. Recently there have been 125 cases reported. It was striking in my series of cases that the pictures of encephalitis and encephalomyelitis were distinct, and that they were all associated with vaccination. I have no ideas as to the cause of this condition. I tried to give the impression that there was association between the two, that these two things occurred together. Whether the smallpox vaccination was directly or indirectly responsible, or played any part, I am at a loss to state.

A great deal of work is being done on the subject in this country and Europe, and from the literature there is no doubt that this is a distinct disease. Dr. Simon Flexner appears to hold this view. I have been struck with the frequency of myelitis or cord involvement which was present in practically all of the cases. In this they differed from encephalitis.

THE TREATMENT OF PERFORATIVE PERITONITIS*

By FRANK H. HAGAMAN, M.D.,
Jackson, Miss.

The treatment of peritonitis due to the contamination of the peritoneum from perforation of some hollow viscus has benefited more by recent advances in surgery than has any other acute intra-abdominal condition. Earlier diagnosis of appendicitis, and better management of all acute conditions within the abdomen by the family physician, together with a better understanding on the part of the laity of the dangers of procrastination, have greatly reduced the incidence of this complication. The peritonitis case now gets to the surgeon in an earlier stage, and in much better condition for operative procedures, which factors tend toward lower mortality.

With many of us, however, the treatment of peritonitis is still a very live subject, and at the risk of incurring your displeasure by bringing you nothing new or original on a much discussed subject, I wish to call your attention to the details of a post operative regime which has proved satisfactory to all the surgeons connected with the Mississippi Baptist Hospital.

In reviewing the literature on the treatment of peritonitis, one is impressed with the fact that the keynote now is simplicity. Irrigation of the peritoneal cavity, the introduction of antiseptics, multiple drains and all the vigorous post operative treatment directed toward "moving the bowels" has been discarded. More and more confidence has been placed in the peritoneum's ability to resist invasion, and it would seem that the trend of surgical thought is toward securing the most favorable possible condition for the fight and then leaving it up to that most efficient serous membrane. Surely, if the peritoneum was ever successful in winning out in the face of a dose of pituitrin every three hours, how much better are its chances when it is placed at physiological rest, and all its power is directed toward overcoming infection? Regarding the time for operation, I must confess that, although I am sure the advocates of delayed operation have a sound basis for their views, I never hold a case of perforative peritonitis longer than enough to institute measures to combat shock, never longer than one or two hours.

We consider only those cases in which a definite abscess is present as local peritonitis, and all others as spreading peritonitis. As a matter of fact, no distinction is made in the post operative care because, after all, all cases are potentially spreading peritonitis after the abscess has been ruptured.

At operation an incision which gives free access to the diseased parts and reduces to a minimum the time of operation; careful hemostasis and gentleness in handling tissues are essential. In those cases due to appendicitis we dare leave the focus of infection only if the abscess is well walled off.

Enterostomy is reserved for those cases which present the condition described by Sampson Handley as ileus duplex: distention of the small bowel above the advancing infection. When there is no distention, an enterostomy is not needed, and when distention is due to a diffuse involvement of the visceral peritoneum, it will not function. As a matter of fact, it has been our experience that when the peritonitis has become so generalized as to cause distention from paralysis of the intestines, no treatment is often of much avail.

The only drainage employed is rubber tissue from the site of the infection and from the pelvis in those cases which have a collection of pus in that portion of the abdominal cavity. Cigarette drainage has been discarded, because, after a few hours, when the gauze meshes become clogged with pus and serum, it ceases to function, and rubber tubes give the added danger of pressure necrosis, without more efficient drainage than the rubber tissue.

Having secured the most favorable condition for the combat, we feel that the ideal treatment is one which (1) puts the peritoneum at rest; (2) maintains nutrition of the entire body; (3) automatically maintains the normal level of blood chloride; (4) does not cause undue discomfort or pain; (5) is easy to administer; and (6) is free from danger.

Our present plan represents a gradual evolution, beginning with the adoption of the continued intravenous drip of Matas, the introduction of which has been of more value to us than has any other advance in surgical treatment for the past ten years.

Using that as a basis for our plans, we feel that we have arrived at a practical, efficient, safe

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and easy method of intravenous administration of sufficient glucose, saline and fluid to carry on body metabolism. There are technical and mechanical difficulties to be overcome, however, and realizing that in the past, these differences have prevented us from deriving the maximum benefit from this measure, I wish to describe our method of preparation and administration of the solution.

The water for preparation of the solution must not be over 24 hours from the still. To this are added chemically pure sodium chloride tablets to make a 0.9 per cent solution, which is autoclaved. Just prior to its administration the saline solution is heated to about 45° C. and 50 per cent glucose is added to make a 5 per cent solution.

I have two lantern slides of the apparatus which I should like to show at this time.

As you see, this consists of a one liter infusion flask made of Pyrex glass, two pieces of 7 mm. diameter rubber tubing, connected by a Murphy drip bulb, and a piece of 4 mm. diameter rubber tubing connected to the distal end by a glass connecting tube, a Hoffman clamp and a 20 gauge hypodermic needle. The syringe to be attached to the end of the rubber tubing is a Kaufman Luer two-way glass syringe.

New rubber tubing is boiled in 5 per cent sodium hydroxide solution, soaked in running tap-water for twenty-four hours, washed in distilled water and the whole apparatus is finally sterilized in distilled water. It is then placed in a sterile package and kept for use at any time. For administration, the drip outfit is first rinsed with a small amount of glucose solution, after having been assembled, and the liter flask is filled. The solution is allowed to run into the tubing until it has completely filled all of the tubing and all air has been displaced. A piece of adhesive is applied over the Murphy drip bulb air vent hole when the fluid appears in the glass. The clamp is then tightened on the rubber above the Murphy drip bulb and the needle is introduced into the vein. The stand is elevated to the desired height and the solution flows by gravity as fast as a 20 gauge needle allows. The rate of flow, however, can be regulated by counting the drops as they fall into the bulb. It is our practice to regulate the flow so as to allow 20 to 30 minutes for the introduction of 1,000 c. c. of fluid. To an adult, 1,000 c. c. of 5 per cent glucose solution in normal saline is given followed by 1,000 c. c. of normal saline solution; this procedure being repeated three times daily. It is continued until the patient begins to expel flatus, or, in other words, until paralytic ileus is relieved. In peritonitis cases no fluid is allowed by mouth or by rectum. The rectal drip has been discontinued for three reasons: first, because it frequently fails to function; second, it often causes distention and discomfort; and lastly, because it is not necessary. With the administration of so much glucose and fluid as this, we have found that our patients do not have the extreme thirst which often has tempted us to allow fluids by mouth, and they show no signs of insufficient fluid intake, such as dry tongue.

My purpose in presenting this subject to you is to emphasize the importance of securing absolute physiological rest of the gastro-intestinal tract. I will, therefore, not take up the discussion of other measures used in the treatment of peritonitis further than to mention that the nasal tube has been of great benefit to us in those cases in which there is present duodenal regurgitation. Opiates are, of course, given in sufficient quantities to secure comparative relief from pain. An occasional enterostomy is still necessary, but we find under our present routine that the number has been markedly diminished.

I was impressed by the recent editorial in *Surgery, Gynecology and Obstetrics* by Willard Bartlett, Jr., who advocated the use of spinal anesthesia as a diagnostic and therapeutic aid in cases of suspected mechanical obstruction following operation.

In conclusion, I wish to say that this is not an argument for the intravenous administration of glucose and fluids. This procedure is well established and is used by all of us. I have endeavored instead to give you an efficient method of administering sufficient glucose, saline and fluids to carry on body metabolics without utilizing any portion of the gastro-intestinal tract and without causing any undue discomfort to our patients.

Having standardized the procedure, we now use it in any case in which it is unwise to utilize the gastro-intestinal tract.

Since January 1, 1929, 1,689 intravenous injections have been given, with a total of only six reactions, none of which amounted to more than a slight rigor and two to three degrees of hyperpyrexia, three of which were due to the use of an imperfect glucose product.

DISCUSSION (*Abstract*)

Dr. Paul G. Gamble, Greenville, Miss.—In the treatment of general peritonitis the element of time plays a great factor in determining the prognosis of the case.

If the diagnosis is made early and the proper treatment instituted, the recovery of the patient will be greatly hastened.

Supportive measures should be used in all cases of general peritonitis.

If the case is very toxic and depressed, blood transfusion should be done before any operative procedure. Normal saline subcutaneously or 10 per cent glucose is given intravenously according to Matas' method.

We prefer the continuous intravenous injection to the large quantity of glucose given two or three times a day.

The proper anesthetic should be selected. We use local anesthesia combined with nitrous oxide or ethylene.

Free drainage should be instituted and the patient placed in a position that will favor the best drainage. We have found that placing the patient on the abdomen will do this. An enterostomy tube should always be put in the bowel, as many of these cases are prone to develop intestinal obstruction.

Dr. Edward T. Newell, Chattanooga, Tenn.—I do not believe that we should wait or withhold saline and glucose in cases of perforated appendicitis following any severe abdominal operation after prolonged anesthesia or operation.

It is a splendid idea to withhold fluids by mouth for forty-eight to seventy-two hours. In our clinic we make it a routine to give such patients 1,000 c. c. of glucose in normal saline, either 2 or 5 per cent, depending upon the condition of the patient. This method seems to be a rational procedure, using two tubes, one under each breast in case of a woman, or down the sides in men. This allows the patient probably a little more liberty than the intravenous method.

If you give this solution every eight or twelve hours, depending upon the condition of your patient, you will find, provided you have withheld all water by mouth, that your patient is in far better condition at the end of forty-eight hours.

Dr. Hagaman says that we should occasionally do an enterostomy. I do not think we ought to be long in determining just what is the condition in perforating appendicitis. If there is a mechanical obstruction in addition to the peritonitis, an enterostomy should be done quickly; or if we operate early enough we may break up adhesions and free the gut. An enterostomy is very comforting in the presence of increasing distention when the patient is restless and vomiting, with a slight increase in the temperature and pulse rate.

One thing that has helped us a great deal of late, when we are undecied as to what is going to be the outcome, after say, forty-eight or seventy-two hours, in the presence of great distention and rapid pulse, is the use of the duodenal tube passed through the nose. Some men elevate the foot of the bed, letting the tube remain in the stomach for twenty-four or forty-eight hours. By this procedure you may avert an operation in cases due to ileus. It is not always possible to determine whether there is a paralytic ileus or whether there is some mechanical obstruction along with it. I think it wise when in doubt to err on the side of safety by opening the abdomen, taking up the first loop of distended bowel as low as possible and introducing a tube.

Dr. Hagaman spoke of draining the intestines with pituitrin and eserine. You often find after putting in your tube that you are able to drain only a small segment of the bowel provided the paralysis has been of long standing and the intestine is widely dilated.

In those cases, if you find that your tube is not draining properly, I see no reason why you should not use pituitrin to help stimulate peristalsis, continue to use the infusion, use the duodenal tube, and through the tube in the abdomen, why you should not use something within the intestine to stimulate peristalsis, for death is impending and the patient must have immediate relief.

In a few terminal cases where the patients were in great distress (distended), where the pulse was rapid, and the temperature high, I have even resorted to injecting 3 or 4 ounces of castor oil into the enterostomy tube and then clamping it off, leaving it clamped for three or four hours. Later, connecting it again, I found ten or twelve hours afterwards that splendid drainage through the tube, in the container over the side of the bed, had taken place, and in twenty-four hours the patient had a free bowel movement.

We then, in late or terminal cases, may have to resort to a duodenal tube, a tube in the vein, or hypodermoclysis; a tube in the gut, a rectal tube and pituitrin or eserine to save the life of our patients.

Dr. Isidore Cohn, New Orleans, La.—Dr. Hagaman did not describe the method of getting into the vein which Dr. Matas uses and the method which many of us have followed for many years. Dr. Matas described a cannula which has one opening at the end and an opening on the side, so that if your end opening should be against the side of the vein and become obstructed, the fluid flows through the side orifice.

Once the fluid flow has been regulated, in order to maintain it the internists use a strip of adhesive plaster to close the opening. You do not have to stand by and regulate the stop cock.

The arm is always placed on a board because of the danger of the patient's moving his arm. If a needle is used movement of the arm may dislodge the needle. Hence the cannula has been used. The rate of flow should not be faster than 60 to 90 drops a minute. We do not give 1,000 c. c. in one hour, but we give the intravenous drip continuously for a period of twenty-four to forty-eight hours. If glucose is being used, the urine is watched all the time for overflow. In some instances where a large quantity of glucose is used insulin may be given with it.

Dr. Hagaman (closing).—Dr. Gamble mentioned anesthesia. I have recently used sodium amytal as an anesthetic in peritonitis and was delighted with the result. While relaxation of the abdominal wall was not complete, I was able by injecting novocaine into the muscle to get more complete relaxation. The patient slept for twelve hours following the operation, awakened without nausea and went through the convalescence without nausea or vomiting. I feel that sodium amytal is a coming anesthetic.

In reply to Dr. Cohn's inquiry in regard to the method of getting into the vein, I will say that we have never had any difficulty in introducing an ordi-

nary twenty-gauge needle into the vein at the elbow. This needle is attached to the Kaufman-Luer syringe, which in turn is a part of the complete intravenous outfit.

LIMITS OF NORMAL FROM A CLINICIAN'S POINT OF VIEW*

By OLIVER C. MELSON, M.D.,
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The inspiration for this dissertation on the limits of normal has come from the occurrence of deviations from our usual standards in individual examinations. It is not intended to refer to so-called "borderline cases," but rather to focus your attention upon some apparently physiological normals beyond what are ordinarily considered the limits.

The theme is a broad one, inasmuch as the clinician necessarily must be cognizant of the normal limits of anatomical structures as well as physiological functions.

Normal standards have been established by the examination of large numbers of individuals and the compilation of averages therefrom.

When clinical application of blood chemistry was first begun, certain standards of normal were established for purposes of comparison. The values given these standards were based upon the content of the substance in the blood after a twelve to fifteen hour fast. In investigating an unknown today we compare the quantities of the various substances found in the average blood with those found in the blood of the unknown collected under similar conditions. Collectively, this is sound, but in the individual case I believe we should have more strictly supervised standards. Such standards should be based upon examinations made with as many variables as possible controlled. The influence of rest, exercise, type of food, psyche, and so forth, should be ascertained and basic standards established. Further, the personal equation between the observer and the patient must be controlled. For instance, a patient is undergoing examination for some cardiac affection associated with hypertension. Urinalysis shows none of the indications of a kidney involvement, yet the blood non-protein nitrogen is 40 milligrams per 100 cubic centimeters. This is beyond the usual normal standards of 25 to 30 milligrams, and, yet, it may be the individual normal of the patient. Or, if conditions of both standard and unknown were identical before the samples were obtained, the patient's nitrogen value might come within the standard limits.

Perhaps one of the best controlled clinical tests is the basal metabolic rate, yet there is a difference of twenty points between the high and the low normal limits. True, in well defined deficiency or hyper-activity these limits appear sufficient. However, in some cases it is an advantage to have a closer check upon the individual normal. I have a patient whose apparent normal is minus 29. This was established through the laborious method of administration of dessicated thyroid and checking by repeated determinations of the rate. Raising her rate within the ordinary normal limits developed a tachycardia and nervousness with tremor and loss of weight, while in maintaining her rate at minus 28 or 29 she experiences no subjective symptoms and can pursue her ordinary activities. This is the lowest normal rate I have ever seen, and there may be an explanation for it. This patient had been treated for exophthalmic goiter by x-ray in 1914. Her rate at that time is unknown. What effect the x-ray has had upon her normal rate can only be a matter of conjecture, but it may have had some influence upon it.

Another example of the type of case in which an individual normal is desirable is that of a girl who had been operated upon for an exophthalmic goiter. In three years she developed symptoms of a recurrence. Her rate was plus 16. Using our usual standards, she could be anywhere from 26 to 6 per cent above normal. When we maintained a rate of plus 2 to 3 by means of Lugol's solution her symptoms disappeared and she felt perfectly well. Had an individual normal been previously established, judgment as to permanent treatment could have been exercised immediately instead of by the round about method which was necessary under the present state of our knowledge.

I am sure every one here has been confronted by problems the solution of which seems based upon an unknown normal. Such is the following:

A man was referred to me for diagnosis. He had no complaints, but during the course of an examination for instance, signs of an aneurysm of the right subclavian artery were found. The signs were still present when I examined him first and again four months later, although no increase was present. An increase in density corresponding to the site of the signs was

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visible in the x-ray. No etiological factor could be elicited. Injury and lues were especially considered.

There were three questions to be solved: first, is this really an aneurysm of the subclavian? Its rarity makes me hesitate before confirming the diagnosis. Second, is it a congenital anomaly? Thirdly, are we justified in advising the insurance company that this man is not insurable? The first two questions are of interest only to us and are rather academic in importance. The third, however, is of vital importance to the patient, and I must confess I cannot answer. May this not be a normal phenomenon for this man? May not the walls of this artery be as strong as those of his other vessels? In examining this patient, I wished many times that I had had an opportunity of examining him several years before, so that his normal structure might have been recorded.

Even in the temperature, at times a knowledge of the individual normal is of value. I have under observation a man whose normal temperature for several years has been 96.8° F. Obviously, it is impossible to say that this was his normal during health, because he has been a victim of syphilis for many years. Nevertheless, during acute illnesses recently his temperature has varied according to the unusually low standard mentioned. Such a low normal might account for some of those cases which we see without fever, or with only a small degree of fever, when by all the rules of the game, the temperature should be elevated several degrees, as in a recent case of suppurative appendicitis in a young man. His temperature by rectum was 99° F., and his leucocyte count 17,000. Also the individual standard of normal might account for some of those cases of "fever of unknown origin" frequently noted in the army.

Hemoglobin estimations have been noteworthy for their unreliability. Not only have the limits of normal been variable, but the individual normals could not be uniform unless the records showed the type of instrument used. Because the test is based on color matching, the acuity of the color vision of the observer also is a factor. It is to be hoped that the new photostatic hemoglobinometer originated by Sanford and Sheard will be of material assistance in obtaining reliable individual standards. This instrument shows the number of grams of hemoglobin per 100 c. c. of blood.

Perhaps it might be of value in the estimation of normals to do as Dr. W. E. Garrey, Professor of Physiology at Vanderbilt, has done in his studies on the basal leucocyte counts, namely: to differentiate the normals established during rest from those established during ordinary activity. He found that the leucocyte count could be raised as high as 18,000 by pain or by some nervous or psychic disturbance. Exercise might raise the count to 26,000 or 35,000.

It is impossible in the time allotted to enumerate the various types of individual variations occurring beyond the limits of normal as set by the usual standards. They might properly be designated as anomalies, yet I believe if our standards were better controlled the number of such anomalies would decrease. Further, if individual normals could be established, I believe that our knowledge of fundamentals would be enhanced and that certainly our clinical diagnosis would be more exact and scientific. Wild as a Utopian dream though it may seem, it is not beyond the realm of possibility that through our educational programs the public may see the importance of an examination for the determination of the individual normal. It is fully as important as the periodic examination now advocated for those over forty.

DISCUSSION *(Abstract)*

Dr. J. T. Martin, Oklahoma City, Okla.—Knowing the normal is the essence of the practice of medicine. Disease is simply that which departs from the normal and, as we have all observed, physiological and anatomical changes from the normal do not always necessarily mean disease. These two statements may seem contradictory. Dr. Melson did not limit his subject to the instruments of precision named in his paper: the blood count, the metabolism record and various other devices that we now use that are mechanical in nature. With these devices the machinery may vary and give us results that are not accurate. The individual reading of the instrument, the interpretation of the blood count or the color matching may vary. Those are personal things that make in these instruments of precision another element of error.

We do have many variations from the normal anatomically in different individuals. For instance, we often have transposition of organs: a right-sided heart and left-sided liver, a right-sided stomach and left-sided appendix, and that would be that individual's normal. We can never explain these various anomalies and classify them so that human nature will show no variation.

The internist must weigh the value of each of these instruments of precision very carefully and summarize what each means in his patient's variation from normal, which may be different from some other reading of a variation from normal. The internist sells to the public one thing only and that is his judgment; that is, the careful weighing of the value of all of these departures from the normal.

Among the methods of precision which Dr. Melson did not mention there are several others that show

great variations: for example, the Ewald test meal. Could anything vary more greatly within normal limits than this simple test? And yet, it is of great value and must be estimated in the summing up of the normal physiology of the stomach.

After the thyroid is removed, there are so many reactions from normal that it is very difficult to establish the normal. As Dr. Melson advocates, it must be individually established with each patient.

Dr. Melson (closing).—Our first contact with a patient is usually during an illness. We must deduce the individual normal from the mass normal. If we could have some means of establishing an individual normal as a basis of comparison during an illness, then I believe our acuity of diagnosis would be increased.

EDEMA OF THE EXTERNAL GENITALIA OF THE FEMALE AS A COMPLICATION OF PRIMARY SYPHILIS*

By PAUL F. STOOKEY, M.D.,
F. C. HELWIG, *M.D.*,
and
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This observation of the clinical manifestations of primary syphilis upon the external genitalia of the female and the frequent association of the primary lesion of syphilis with a specific edema is based upon a five-year study of syphilis in women in the wards of the Kansas City General Hospital and its associated dispensary. The hospital and clinic records show that 4,370 cases have received treatment for syphilis in the institution during the five-year period. New cases were received at the rate of 66 per month. The total number of treatments administered during the five-year period were approximately 74,000. Of the 4,370 cases of syphilis received, 1,897 were males, 1,647 were females, and 268 were children suffering from congenital syphilis.

The Dispensary physician who has the clinical material available to study syphilis in the female is impressed by the fact that a typical Hunterian chancre is very exceptionally encountered.

It has been our routine procedure in all cases of early cutaneous syphilis to attempt to locate the anatomical point of entry of the invading *Treponemata pallida*. The satellite bubo is the guide-post that points with an unerring finger to the initial sclerosis. In the presence of an early cutaneous manifestation of syphilis associated with ar absence of the satellite bubo, the assumption that the chancre is imposed upon the cervix can be substantiated by biopsy or dark field examination in the majority of cases. In the presence of early secondary cutaneous syphilis associated with a syphilitic bubo in the inguinal glands, the clinician must look to the external genitalia as the port of entry of the invading *Treponema pallidum*. We have been profoundly impressed by the large number of cases of early secondary cutaneous syphilis in the female, in which a satellite bubo was present in the groin associated with an edematous swelling of the vulva, involving particularly the labia, the minor labia showing the supreme degree of edema.

The association of edema with the primary lesion of syphilis in women is not a recent observation. Ricord taught that the edema which is often a complication of primary syphilis in women is a specific edema, the response of the lymphatic tissue of the vulva to syphilitic infection. He explained the greater frequency of this edema in the female as compared to the male by the anatomical fact that the lymphatic structures in the genitalia of the female are greatly in excess of the lymphatic structures present in the male genitalia. Clinically, we have found this observation to be correct.

The English literature is meager concerning this edema. The pathological literature, describing this complication of primary syphilis, is more extensive. Shillitoe, in the D'Arcy Power "System of Syphilis,"[1] describes the edema from a clinical standpoint. Many text-books of gynecology do not mention the association of this edema with primary syphilis. This swelling, which is in my judgment best described as syphilitic edema, is generally confined to the labia, as a cold boggy swelling that involves particularly the labia and fades into the normal surrounding tissue. It is indolent and shows no tendency to suppuration, abscess formation or ulceration.

Regression is very slow and the process is extremely indolent. Pain is absent. The labia minora generally presents a greater degree of edema than the labia majora. Delamere,[2] in his "Anatomy of the Lymphatics," states that the lymphatic supply of the labia minora is twice that of the labia majora. It is the rule to find the labium minor so markedly edematous

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*From the Dermatological Service of the Kansas City General Hospital.

that the labium major is pushed to one side and the minor labium presents itself as a swollen ridge as large as a man's thumb. So frequently have we encountered this condition that we consider it of great clinical importance in the diagnosis of primary syphilis. The normal secretion of the parts is increased, and as a result of the edema the horny layer of the skin becomes macerated and the swollen tissue may exude serum. From this serum a positive dark field specimen may be obtained. Associated with the edema, careful inspection may reveal in the majority of cases, an area generally about the size of a silver dime that is denuded of integument and indurated. This represents the area first invaded by the *Treponemata pallida*. In a smaller per cent of cases, the initial plaque cannot be identified, the edematous reaction being the only indication of successful invasion by the *Treponemata pallida*. The site of the primary infection may be anywhere upon the external genitalia. The urinary meatus is not an unusual location. The edema will involve both sides of the vulva if the initial lesion is near the anterior or posterior commissure.

It is possible to produce a violent Herxheimer reaction in syphilitic edema subsequent to the administration of organic arsenic. Recurrence of the swelling is frequently observed subsequent to inadequate treatment.

When a characteristic chancre exists upon the labium it is occasionally associated with a coexisting lesion at an exactly opposite location upon the opposing labia.

The clinical diagnosis of primary syphilis upon the external female genitalia is more difficult than in the male. Mucous patches are numerous, and destructive, moist papules are luxuriant in development. Irritating vaginal discharge may produce excoriations. The situation is further complicated by the teaching that primary syphilis in the female may be of such transitory character that involution of the primary focus has occurred before cutaneous manifestations develop. In our experience, this latter observation is erroneous. One of the characteristics of the edema, which we have frequently found associated with primary syphilis in the female, is its indolent character.

We have not had the opportunity to observe the syphilitic edema before the development of constitutional syphilis. Such a swelling, involving particularly the labia, would demand differential diagnosis from edema from constitutional causes: from Bartholin's abscess, irritating vaginal discharge, tuberculous ulceration, gumma, intertrigonous erosions, pseudo-elephantiasis, chancroid, and the exceptional neoplasm. If the serum exuding from the edematous vulva be subjected to dark field examination and the blood sera be submitted to the Wassermann reaction, the presence or absence of syphilitic edema can be established with certainty.

An attempt was made to inject the lymphatics of the female cadaver to illustrate the rich lymphatic structures of the vulva after the technic of Sappey.[2] He has shown in his preparations the extreme abundance of lymphatic structures in the vulva, particularly the labia minora. Our attempts were unsuccessful due to our lack of familiarity with the extremely delicate technic required for this procedure. The lymphatics of the vulva are, according to Delamere,[2] unusually rich, the tissue of the labia soft and loosely adherent to the underlying structures. Microscopically, the findings from biopsy specimens are by no means thoroughly enlightening.

In all the cases in which biopsy was done cutaneous syphilis was present. The labia presented the characteristic syphilitic edema and the satellite bubo was present in the groin. Spirochetes by dark field examination from the edematous labia were found in all cases and the Wassermann reaction was positive. The most striking clinical feature was the syphilitic edema.

The biopsy specimens showed similar histological pictures throughout. Two of the seven biopsies were not used in this comparative study because such severe complicating secondary infection was present that the normal markings were completely obscured. Three of these cases showed minimal changes. The epidermis was not interrupted and patchy areas of fairly dense mononuclear infiltration were found in the dermis with a strong tendency to a perivascular arrangement. The small blood vessels showed a striking swelling and even desquamation of the endothelium; the deeper layers showed scattered perivascular round cell foci, and between the patchy areas of intense dermal infiltration the dermis and deeper layers presented only a low grade swelling of the collagenous connective tissue with considerable edema.

This edema could be readily distinguished under an oil immersion lens magnification, but was better illustrated by careful examination of the elastic fibers. Unna[3] states that an edema may be overlooked. "When an elastic fiber is stretched across an opening in the tissues in a different direction to the neighboring fibers, that

space was present in life" and is not an artefact.[3] We found under high magnification a very well marked edema as judged by this standard since such spaces are numerous, particularly in the dermis. The lymphatics likewise presented some surrounding infiltration of round cells with endothelial swelling and even desquamation of these swollen cells into the lumina of the lymph channels.

The two remaining cases showed a picture similar to the three preceding with some interesting additional features. The mononuclear infiltration of the dermis was greatly accentuated, but continued to be of a patchy character. However, it was much denser, broader, and was accompanied by the formation of numerous giant cells. Many of these were of the foreign body variety, while others resembled more closely the Langhans type. They were all found in rather dense granulomatous foci in which lymphocytes, dilated capillaries, fibroblasts and plasma cells were the chief components. Peripheral to these patchy granulomatous foci in the dermis there was, as in the former sections, very little to be seen except that the edema here was very striking even to the extent of almost obliterating the normal markings and in places it seemed to be almost lifting the epidermis from the surface of the dermis. This intense edema in the corium was present in all the specimens submitted to histological study.

This syphilitic edema, indolent in character, exuding serum from which innumerable *Treponemata pallida* may be found by dark field examination, suggests the specific nature of the swelling. The anatomic fact that the female genitalia is much richer in lymphatic structures than the male, coincides with the frequency of syphilitic edema in the female as compared to the male. The question resolves itself into the explanation of why syphilitic edema should occur as a complication of primary syphilis in one female and be completely wanting in another. This phenomenon cannot be explained in the light of our present knowledge and demands further consideration. We are at present engaged in a further study of it.

SUMMARY

(1) Classic Hunterian primary syphilis is not frequently encountered in the female.

(2) Syphilitic edema is a frequent complication of primary syphilis of the female genitalia. This edema may be associated with a primary sclerosis or it may be the only evidence of successful invasion of the female genitalia by the *Treponemata pallida.*

(3) The factors that determine the presence or absence of this syphilitic edema in primary syphilis of the external female genitalia are yet to be determined.

DISCUSSION *(Abstract)*

Dr. Joseph A. Elliott, Charlotte, N. C.—Due to the peculiar anatomy of the female genitalia, we see some edema associated with practically all lesions of these organs. This has been very excellently demonstrated, I think, by a scientific exhibit which Vanderbilt University has at this meeting.

Dr. Stookey states that in a majority of these cases a visible lesion was present. In such cases we should pay particular attention to the lesion itself in establishing the diagnosis. On the other hand, he had a few cases in which there was no visible lesion. In these patients, particularly if there is an inguinal adenitis, dark field examinations should be made from the exudation, and in case the exudation is not present the *Spirocheta pallida* should be looked for in material aspirated from the enlarged glands.

We should learn from this paper to regard all cases of edema of the vulva with suspicion, and we should not pass them up without making an examination to determine whether or not the patient has primary syphilis.

Dr. Thomas W. Murrell, Richmond, Va.—I think Dr. Stookey said that in many of these cases there was a similar lesion on both major labia. I should like to ask him whether the dark field showed a syphilitic lesion on both.

Dr. I. R. Pels, Baltimore, Md.—I wish to ask whether any complications arise in connection with these manifestations on the labia? I have in mind one patient who had this type of lesion, but the predominating lesions were superficial ulcerations which could not be examined at the time because the patient was about to go into labor. She had nothing to indicate syphilis otherwise; but I heard just before I came here that she was delivered of a child who was syphilitic, the blood Wassermann test being positive, and her husband also giving a positive Wassermann test.

Dr. Udo J. Wile, Ann Arbor, Mich.—One sees an analogous edema in men, particularly in those who may have a sore under a redundant prepuce. Under these conditions, edema may be an outstanding feature of the case for many days and weeks, rendering the chancre an occult although palpable lesion. I have seen a number of such cases. In fact, we are seldom without them in our Ward.

Dr. Stookey (closing).—In this series of cases a positive Wassermann and positive dark field associated with cutaneous syphilis was present in every case. The eruption was the factor that brought the patient to the dispensary.

POST-ARSPHENAMINE DERMATITIS*

By HARRY M. ROBINSON, M.D.,
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Dermatitides following the administration of the arsphenamines are still encountered with sufficient frequency to merit occasional review of the subject, with the hope, that in the general discussion aroused, some guiding principle may be attained which will help in the elimination of these untoward reactions, and thereby make the administration of the arsphenamines less dangerous.

Many theories are advanced to explain the cause of arsphenamine dermatitis; chief among these are such factors as faulty elimination of the drug by the liver or by the kidneys; too large and too frequent individual dosage; the simultaneous administration of mercury or bismuth compounds preceding or accompanying arsphenamine therapy; and allergic instability or sensitization to the drug. It is now generally agreed that, in contradistinction to post-arsphenamine jaundice, the reactions of the dermatitis group (various forms of dermatitis, stomatitis, and perhaps some of the blood dyscrasias) have a sensitization basis. Various factors have been cited as predisposing to the phenomena of sensitization, notably the use of certain products (for example, sulpharsphenamine) and the presence of focal infections.

In this report, we shall omit detailed consideration of such dermatitides as immediate urticarias or temporary evanescent toxic erythemas, and limit the discussion to the important clinical findings in a group of 83 patients with moderate or severe arsphenamine dermatitis. These are believed to represent all instances of noteworthy dermatitis arising among some 10,000 patients treated from 1916 to 1928, inclusive. The dermatitis in a few patients may have been missed through failure of the patient to return to the clinic, even though social service follow-up is well organized. At least one-third of the patients had developed dermatitis after treatment given elsewhere, so that the incidence of dermatitis in our material is lower than the figures suggest. The patients in this group are practically evenly divided as to race (46 were colored and 37 white) but the colored attendance at the clinic was higher than white, about 3-1. There is a striking preponderance of the dermatitides in females, namely, 68 women as opposed to 15 men, though attendance in the clinic is evenly divided between men and women.

We have arbitrarily divided this series into the following three groups:

Mild (including recurring urticarias and evanescent erythemas), 22 cases.

Moderate (including the erythemato-squamous, papulo-squamous and papulo-vesicular types), 52 cases.

Severe (the generalized exfoliative dermatitides), 33 cases.

In eight of the severe cases there had occurred, one to seven weeks before the appearance of the exfoliative rash, one or more immediate or slightly delayed urticarial attacks. This is an interesting and important fact, since we have tended to regard urticarial rashes as generally insignificant and not as a contraindication to further arsphenamine therapy. These figures, however, indicate that further arsphenamine may be dangerous and must be used with great caution. In several instances, a very severe dermatitis was precipitated or intensified by continued treatment with the same drug, either through accident or inexperience, after the appearance of a moderately severe type of eruption. In eight of our cases death resulted, usually from kidney damage or secondary bacterial infection.

In this group of 83 patients there were 107 attacks of dermatitis after injections of the following arsphenamine products: arsphenamine seventy, neo-arsphenamine eleven, silver arsphenamine five, tryparsamide two, sulpharsphenamine two, bismarsen two. Of these, eighteen had two attacks and three had three attacks. Two of the recurring attacks were due to the intradermal injection of one drop of 1-6400 solution of arsphenamine (in the course of a cutaneous sensitization test), and one of these two patients developed a mild generalized erythematous exfoliative dermatitis.

It will be noted that the drug causing seventy of these attacks was arsphenamine, and in only eleven was neo-arsphenamine responsible. This is wholly due to the fact that since the earliest days of the clinic, arsphenamine has been the drug of preference, when the patient's condition did not contraindicate it. Neo-arsphenamine has been used comparatively infrequently (in the approximate proportion of eight arsphenamine injections to one of neo-arsphenamine), and not in large doses. Reactions of the dermatitis

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groups (and also jaundice) are, in our experience, certainly as frequent proportionately with neo-arsphenamine as with arsphenamine. On the other hand, Schamberg, in a recent report, advocates the use of neo-arsphenamine as the drug of choice, and maintains that its use in small doses has brought about the almost total elimination of reactions of all kinds in his department. Our findings with neo-arsphenamine (DRL) as shown above, do not confirm this view.

The preparation and administration of the drugs since 1912 have been under the supervision of the same graduate physician, and careful technic has been observed, practically excluding reactions due to variable or improper technic. Only sterile freshly distilled water, prepared on the day of administration, has been used; the product, in preparation, is not unnecessarily shaken; chemically pure sodium hydroxide, 15 per cent, is used, prepared in sterile distilled water.

The dosage of arsphenamine, as a rule, does not exceed 0.4 gram for males and 0.3 gram for females, and of neo-arsphenamine 0.9 gram and 0.75 gram, respectively; though this dosage is often lowered where physical examination indicates subnormal weight or poor general physical condition. The dose, however, has no relation to the occurrence of postarsphenamine dermatitis, which occurs as frequently after small as after large doses. This is particularly true of neo-arsphenamine which recently in our clinic produced a number of distressing instances of dermatitis and jaundice following the administration of a few small doses (0.3-0.6 gram) early in treatment.

To date, there have been administered about 170,000 intravenous injections. The proportion of arsphenamine to neo-arsphenamine injections was, up to the early part of 1928, approximately eight to one. In the last two years this proportion has changed in the course of clinical experimental work, and since 1928 the proportion has been, roughly speaking, five to four. From September, 1928, to September, 1929, 5,280 injections of arsphenamine were given as compared to 3,937 of neo-arsphenamine.

Each patient, before treatment, is given a complete physical examination, including an examination of the urine, and is questioned each week by an experienced graduate nurse before further treatment is given. In this way, we are able to minimize the severity of many reactions by temporary cessation of treatment or change in dose or drug whenever reactions have been severe enough to warrant notice. Itching is a sign especially asked for, and if present, frequent careful observation of the skin is made and a differential blood count is usually done.

In this series, thirteen patients reported the complete absence of prodromal symptoms before the appearance of the eruption. Fifty-eight gave a history of itching, of from one day to eight weeks before the dermatitis. One complained of a sore throat for one week, three of nausea, vomiting, malaise and chill, and eight of acute temporary urticarias and erythemas.

It is noteworthy that there is a wide variability in the time of appearance of the rash in relation to the number of doses, and likewise in the size of the individual dose. In four cases a mild rash appeared immediately after the first injection, all in previously untreated females, each receiving 0.3 gram of arsphenamine; in 14 cases the rash appeared after two injections; in 34 patients, three to six injections preceded the rash; in 22 seven to twelve injections; and in 22 patients, 13 to 30 injections. Thus more than half of the instances of dermatitis appeared early in the course of treatment. The injections are, as a rule, given one week apart, averaging six to eight in a course of arsphenamine. In one patient there were many lapses in treatment, and dermatitis did not occur until the last of a series of twenty injections of arsphenamine over a period of nine years.

We wish to note here that, contrary to the experience of others, extravasation of arsphenamine into the tissues did not seem to be a predisposing factor to dermatitis. Although extravasations occur fairly frequently in our clinic, made by students learning the technic of intravenous administration, extravasation of arsphenamine into the tissues occurred prior to the dermatitis in only one patient of this series, and in this instance the faulty injection was given one week prior to the appearance of the eruption.

Post-arsphenamine dermatitis occurred in 23 cases of Wassermann positive latent syphilis, 19 of secondary syphilis, five of primary sclerosis, nine of demonstrable tertiary syphilis, ten of central nervous system syphilis, six of congenital syphilis, and in four non-syphilitic individuals. The duration of syphilis at the time of beginning treatment varied from ten days to twenty-four years.

In all but eight cases there was complete recovery. The average duration of the eruption in the moderate cases was one week, whereas, in the severe generalized exfoliative types the

average duration was three and one-half weeks, though a few of the patients were hospitalized for as long as eight weeks. One ambulatory patient had a persistent chronically relapsing mild exfoliative dermatitis for five months.

The continuation of anti-syphilitic treatment following post-arsphenamine dermatitis is often a matter of grave concern. In a number of instances we have attempted to resume the use of arsenical drugs. It need hardly be said that this was not tried unless the severity or potential infectiousness of the patient's disease made the effort imperative. In the last eight years no attempt has been made to resume arsenical treatment if the original dermatitis was exfoliative or vesicular in type, since earlier experience had shown that the result was usually disastrous. When it seems essential to try arsphenamine or its derivatives again, the attempt should not be made for at least three months after the subsidence of the skin reaction; and then a different drug should be substituted for the one causing the reaction (for example, silver arsphenamine for neo-arsphenamine), and treatment must be given with the utmost caution, starting with not more than 0.05 gram per dose. If the second attempt does produce dermatitis, the small dosage employed will fortunately keep the reaction mild in character. This system of treatment, as may be seen from the figures given below, permitted us to continue with arsenical therapy in 16 instances. Also, fortunately for most patients with neurosyphilis, tryparsamide, a pentavalent arsenical, may be used with relative impunity, even after a severe exfoliative arsphenamine dermatitis. This is at times almost a life-saving virtue.

In five cases of mild to moderate dermatitis caused by arsphenamine, treatment was resumed after three months with the same drug without further skin reactions. In six patients attempts made to treat again with the same or a different arsphenamine product resulted in a return of the eruption in each case. In eleven instances a change from arsphenamine to neo-arsphenamine did not cause a dermatitis. In 17 cases any of the arsphenamines caused a recurrence of the dermatitis, and in three cases receiving tryparsamide as an alternant a mild rash appeared. In 16 patients, therefore, attempts at renewed arsenical treatment were successful and in 23 unsuccessful. In the latter group, and in the remaining dermatitis cases in whom for one reason or another (usually instances of vesicular or exfoliative dermatitis) further arsenical treatment was not attempted, and the subsequent management of syphilitic infection was carried on with mercury, bismuth and potassium iodide. In these circumstances it is natural to feel that the total duration of treatment should be greatly prolonged, depending on the amount of arsphenamine given before the accident.

Treatment.—In all of the cases arsenical therapy was immediately stopped. The mild and moderate types of dermatitis readily responded to simple local procedures. In the urticarias a subcutaneous injection of 0.5 to 1.0 c. c. adrenaline chloride solution (1-1000) usually gave prompt temporary relief. In the moderately severe cases, following McBride and Denny's procedure, we resorted to hyposulphite of soda (preferably crystals). Our results have not been consistently good with this latter drug. In slightly more than one-third of the cases the response was immediate, the eruption rapidly fading. In other instances, although we gave daily repeated injections of 0.6-1.0 gram of hyposulphite of soda, the response was not remarkable. In the past month we have tried intravenous injections of calcium gluconate, but our experience with this is too brief; in three cases in which this treatment was used the dermatitis began to fade immediately.

Prevention.—This class of reactions has proved to be a severe handicap in the treatment of syphilis, and its prevention would be a great improvement in the modern therapy of the disease.

We have found that by observing the ordinary rules of care the severe dermatitides are held down to a minimum. Itching is a danger signal which should never be overlooked or ignored. If a history of generalized itching is obtained the skin is carefully and repeatedly examined, and a differential blood count should be ordered to determine the presence or absence of eosinophilia. Here, to my mind, lies the greatest hope of preventing severe and exfoliative dermatitis. The elimination of focal infection has not seemed to us to be an important approach to the solution of the problem. All of our clinic patients are of the laboring class and foci of infection in tonsils and teeth are almost universal, to say nothing of the possibility of involvement of sinuses, gastro-intestinal and genito-urinary tracts. The importance of focal infection in arsphenamine lies not in its elimination as a mode of prevention of the reaction, but in the fact that attempts to clear up such foci during the course of a severe dermatitis have in some

instances caused disastrous results. The deleterious effects following operative interference with foci of infection during the course of a dermatitis have been stressed by Stokes. The explanation of this state of affairs may lie in the changes which take place in the bone marrow as a result of arsphenamine poisoning. As Moore and Keidel have pointed out, in post arsphenamine dermatitis there is often severe damage to the bone marrow, as shown by the changes in the blood picture and also by necropsy findings. Since the bone marrow is probably closely associated with antibody production, it is conceivable that the stirring up of an infection in the presence of definite bone marrow changes may find the patient's immune mechanism in a relatively defenseless state.

Stuart and Maynard, among others, have suggested that cutaneous sensitization tests might offer some hope of determining the persistence and degree of sensitization following post arsphenamine dermatitis. The results obtained by workers in this field have been generally inconclusive. We are able to report briefly the results of some unpublished experimental work with intradermal tests with arsphenamine.

We have done intradermal skin tests in 149 subjects, using one drop arsphenamine and neo-arsphenamine in various dilutions, of 1-1600 and 1-2000, and 1-6400 and 1-25,600. Control injections were made with 0.2 per cent and 1 per cent sodium hydroxide solution. These intradermal tests were used in 36 normal individuals as controls and in 19 hay fever patients, representing a group of individuals with known allergic instability; in 61 syphilitic patients, most of whom had had from 6-19 intravenous injections of an arsphenamine product before the test, but a few of whom had had no previous treatment; and in 33 patients who had had arsphenamine dermatitis. Immediate local reactions occurring in less than two hours after injection and almost disappearing in forty-eight hours are unimportant, since to some degree these were present in all patients tested. In 22 of 36 normal individuals, or 60 per cent, there was a moderate to severe local reaction which in every instance, except one, appeared three to four weeks after injection. Of 19 hay fever patients (all known to be sensitive to ragweed, timothy, or both), 13, or 68 per cent, presented reactions of much greater severity than in the normal controls, and all except one appeared early, within the first two weeks. In 61 patients with syphilis, whether previously treated with arsphenamine or not, the reactions observed were slightly less frequent than in normal controls (44 as compared with 60 per cent); and were almost exactly similar in extent. Of 33 patients with arsphenamine dermatitis, 23, or 70 per cent, reacted positively; in 14 the reaction was severe, and in 20 of the 23 positively reacting patients, the reaction appeared early.

The chief practical value of the test appears to be that in most cases of severe post arsphenamine dermatitis, though not in all, a strongly positive intradermal test provides warning that the patient still retains his sensitivity to the drug, and that further arsphenamine treatment must be avoided. Whether the converse is true and a complete negative intradermal test means that the sensitiveness has disappeared, making it possible to resume treatment, is not yet known.

SUMMARY

(1) Certain significant clinical data regarding 83 patients with post arsphenamine dermatitis are reported.

(2) Generalized itching is the most important prodroma of dermatitis, and suspension of, or care in, arsphenamine treatment of all patients complaining of itching will markedly reduce the incidence of severe reactions.

(3) With appropriate caution in treatment it is possible to resume some form of arsphenamine therapy in patients who have suffered with a mild to moderate dermatitis (excluding all instances of vesicular and exfoliative eruptions). This is often of importance in the treatment of patients with contagious syphilis or with grave incapacitating late lesions.

(4) Data are briefly presented as to intradermal skin tests with arsphenamine as a method of determining arsphenamine sensitization. From the practical standpoint the value of this test is questionable.

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Discussion follows paper of Drs. Lindsay, Rice and Selinger, page 718.

PURPURA HEMORRHAGICA FOLLOWING NEOARSPHENAMINE*

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Purpura hemorrhagica occurring during the course of antiluetic treatment by the organic arsenical preparations is, we believe, of sufficient importance and interest to record in the rather small but apparently increasing literature. Although salvarsan as originally introduced by Erhlich has been on the market and in clinical use since December, 1910, it was not until nearly nine years later that the first mention of a purpuric blood dyscrasia was observed or mentioned following its use. The fact that a severe or even fatal reaction may occur with little warning, if any, during the course of the treatment which is usually considered the mainstay of the accepted therapy, makes further study and experimentation with our arsenical preparations imperative.

Guy[1] reported the reactions in a series of twenty-five thousand injections of arsphenamine at Camp Travis, Texas, but he does not mention the occurrence of purpura hemorrhagica. The products from different manufacturers were used, the drug was prepared in various ways for administration and the patients were under more or less constant observation.

Anwyl Davies[2] reported a case of hemorrhagic purpura following the administration of 4.8 grams of novarsenobillon during a period of twelve weeks. Mercury intramuscularly had also been given to this patient along with the arsenic. Signs of purpura, however, did not appear until a period of twenty-four hours had elapsed. This patient had no bleeding from the gums or elsewhere, the bleeding being limited entirely to the skin.

Lespinne and Wydooghe[3] reported two cases of hemorrhagic purpura induced by repeated injections of arsphenamine. In one case the symptoms appeared during the second course of the injections which followed the first course after an interval of three months. The second case appeared following the twelfth injection of the first course. The authors strongly advise the discontinuance of all arsenical therapy, and even intravenous treatment, by any medicament in those patients who show any tendency whatsoever to purpuric manifestations.

Rabut and Oury[4] reported two cases of acute hemorrhagic purpura occurring during the course of arsphenamine therapy, both of which were fatal. They strongly urge the advisability of a bleeding time and a coagulation time estimation in every patient receiving arsenical medication who shows the slightest tendency to bleed.

Weill and Isch-Wall[5] reported ten cases of a hemorrhagic tendency following arsphenamine treatment. These hemorrhagic manifestations were of a large variety, including purpura as well as other forms. They state that once this tendency to bleed has developed, it will recur upon renewal of the arsenical therapy even after a lapse of a long period of time. This seems to be the case in the patient whose history we will report shortly. They indicate that bismuth is better tolerated under these circumstances than the other heavy metals, which condition we also observed; although they report bleeding even after the use of this drug. They stress the value of the bleeding time, repeatedly estimated, as a prognostic indication of the tolerance likely to be shown to arsphenamine; making the observation that any abnormality in the bleeding time would presage the appearance of arsenical intolerance.

C. Morton Smith[6] reported a case of severe bleeding and purpura hemorrhagica following the administration of neoarsphenamine. His patient had received neoarsphenamine treatment on several previous occasions. Following the third injection of the present series he had bleeding from the gums and nose and several purpuric spots over the body. He recovered from these symptoms so rapidly that he was considered to be well enough to have another treatment one week later. He was given 0.9 grams of neoarsphenamine and immediately upon completion of the injection he went into a state of profound shock. He soon developed severe bleeding from the mouth and nose, passed tarry stools, and had many petechial as well as large hemorrhages.

O'Leary and Connor[7] reported two cases of hemorrhagic purpura occurring at the Mayo Clinic following the administration of sulpharsphenamine. Both these patients

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Fig. 1
Large hemorrhagic bleb on left side of tongue.

had been actively treated with arsenicals as well as mercury and both were studied in detail by the authors and shown to have the characteristic laboratory findings such as prolonged bleeding time, lowered platelet count and so forth. In their extensive review of the literature they were able to describe nine different mechanisms by which the condition was considered to be produced; although they are apparently not convinced that any one of these mechanisms is correct. They believe that neoarsphenamine is the most frequent cause of purpura in the circumstances under discussion. Their treatment of the condition has been outlined, although they indicate that it may have had no bearing on the recovery of the patient.

Combes[8] reported a case of purpura hemorrhagica following sulpharsphenamine in which the first indications of hemorrhage occurred two weeks following the last injection of the drug. This is the longest interval recorded as having elapsed between the administration of the drug and the occurrence of the hemorrhages. In addition, the very low leucocyte count, maximum of 1,900 per cu. mm. and minimum 500 per cu. mm., with a complete absence of the granular cells associated with high fever indicates that this patient might have had a coincidental agranulocytosis.

Snell and Rowntree[9] reported three cases of purpuric skin manifestations following the use of merbaphen. Two of these cases were diagnosed as portal cirrhosis and the other case as one of chronic diffuse nephritis. These patients were not considered as syphilitics and the drug was used for its diuretic effects. The purpuric lesions were limited chiefly to the manifestations in the skins and there were no gross hemorrhages. They concluded that the purpuric spots might have been due to the underlying pathological condition which they were treating as well as to the possibly toxic effect of the drug.

A number of other cases are reported by various authors, but as they do not present any special points of difference from these already cited they are not included at this time.

Our case is reported as follows:

Mr. L. G. D., age 51, came to us on July 1, 1927, for a continuation of the treatment he had been having for lues. By occupation he is a clerk in the Government Service and he is frequently transferred from one city to another in the course of his employment, so that he has not been under our care continuously. However, in each new location in which he has taken up his residence he has had some treatment which will be described later, for we have, as far as was possible, a written report from each one of his medical attendants.

At the time of his first visit to us the following data were recorded:

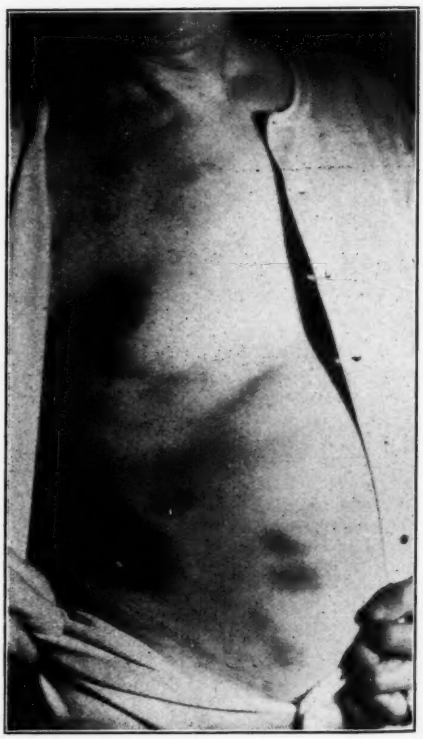

Fig. 2
Large purpuric areas resembling contusions over abdomen and thorax.

Fig. 3
Large purpuric areas and petechial spots over leg.

The family and previous history are entirely irrelevant. He has had three healthy children, who are living and well. He was divorced two years previously. His weight was 192 pounds, height 69 inches, blood pressure 142/90, and pulse rate 72. The skin was clear and there was no adenopathy. There was very moderate enlargement of the heart to the left of the midclavicular line. His chief complaint at this time was nervousness and itching of the feet. All reflexes were normal except for slight swaying with the eyes closed, suggesting a positive Rhomberg.

He presented himself to Dr. C. E. Warde, of Memphis, on March 12, 1927, because of alopecia and generalized skin rash. The Wassermann reaction was recorded as strongly positive. When he left Memphis on March 21, 1927, he had had three injections of neoarsphenamine of 0.45 grams, 0.6 grams and 0.8 grams, respectively, and a similar number of injections of bismuth (2 c. c. each injection). The dosage and kind were not stated.

Dr. C. D. Pullen, of Mt. Pleasant, Michigan, next treated him from the time he left Memphis until May 23, 1927, giving him during that time six intravenous injections of neoarsphenamine of 0.9 grams each at six day intervals, followed by bismuth in 3 grain doses hypodermically at 3-4 day intervals. (The number of these and the preparation are not stated.)

He stayed in Washington for six weeks, during which time he had six intramuscular injections of potassium bismuth tartrate, 0.1 grams each at weekly intervals.

He left Washington in August, 1927, and went to Richmond, where he says he received treatment at regular intervals, but we have no record of what treatment he received in that city.

He did not stay long in Richmond and his next residence was Norfolk, Virginia, where he suffered an experience which he was to undergo at a future date and to a worse degree. While in Norfolk he was treated by Dr. S. H. Bright, from whose report we quote the following:

"I have had Mr. D. on bismuth salicylate until the past six weeks, and for the past six weeks have been giving him 0.4 grams sulpharsphenamine weekly. The last injection, a few days ago, caused bleeding from the gums which I think came from the arsenic." (This was written on January 22, 1928.)

He next went to Savannah, Georgia, where he remained until April 28, 1929, under the care of Dr. G. H. Johnson, who gave him weekly intramuscular injections of 2 c. c. of potassium bismuth tartrate during that period. In addition he gave him by mouth bichloride of mercury grain 1/48 and sodium iodide grains 5 three times a day.

He came to see us again on May 16, 1928. He felt very well at this time. His reflexes were all normal and his Wassermann reaction was negative. Lumbar puncture was advised, but the patient would not submit to it. His blood pressure was 160/90. In view of the rather constant and varied treatment of the patient up to this time, his refusal to have a lumbar puncture done and the negative Wassermann reaction, it was decided to discontinue all treatment for a period of two months.

We did not see him again until January 4, 1929, at which time he came in complaining of a rash over his body. Examination at this time showed a maculopapular and in some places a somewhat vesicular rash scattered rather sparsely over the entire body, but more profusely over the anterior thorax and abdomen and the upper extremities. There was no itching and the patient said he felt perfectly well; but as it resembled in many respects the rash which he had had early in his infection he was anxious about it. A Wassermann reaction at this time was negative, but he was given an intravenous injection of 0.3 grams neoarsphenamine. Two days later the Wassermann reaction was three plus. A week after the first injection a second injection of 0.3 grams neoarsphenamine was given and at this time the rash had faded considerably. Examination one week later and just before the third injection of 0.3 grams of neoarsphenamine showed that the rash had almost entirely disappeared.

This third injection of 0.3 grams neoarsphenamine was prepared and given in the usual manner and several minutes after its completion the patient got off the table as was customary with him and started to walk into an adjoining room. He turned around abruptly, however, and complained of being dizzy. He looked quite pale and he was immediately put back on the table in the recumbent position. By this time he presented

the characteristic picture of the acute nitritoid reaction. He was ashy pale, cold, in profuse perspiration and complained bitterly about the intense and unbearable pain in his lumbar region over his kidneys. Almost immediately bloody frothy sputum was visible in his mouth. Fifteen minums of adrenalin hydrochloride were given subcutaneously with some relief. He soon began to shake and had a terrific chill, followed by the vomiting of bloody fluid. He was then given 1/4 grain morphine sulphate hypodermically and at the end of two hours was in condition to be taken home.

He spat up blood the entire night and on examination the following day he presented the typical appearance of a patient with purpura hemorrhagica. The left half of the tongue was covered with a hemorrhagic bleb and there were several of varying size on the hard and soft palate as well as on the buccal mucosa and lips. The conjunctiva of the right eye showed a fair sized hemorrhage. He had several rather massive hemorrhages over the body and extremities and innumerable ones of pin point size over the ankles and feet. He did not feel badly generally, although he suffered severely from the inconvenience of the constant bleeding from the mouth, and the sore and swollen tongue. He was able to take liquids at all times and there was never any blood in the urine. Treatment consisted of an astringent mouth wash and calcium lactate. In three days the bleeding had entirely stopped and he was walking about the house and shortly thereafter was back at work. The hemorrhagic spots slowly faded away.

On February 28, 1929, his Wassermann reaction was negative and he appeared and felt as well as he ever had. There were no remaining signs of his hemorrhagic condition nor of the rash for which we had instituted the neoarsphenamine treatment. He was, however, given weekly injection of 0.1 grams potassium bismuth tartrate intramuscularly until June 28, 1929, which he took without the slightest discomfort. We have not seen him since that time.

CONCLUSIONS

It appears from this review that purpura hemorrhagica following the administration of the organic arsenical preparations is a not uncommon occurrence, but one which is probably increasing in frequency. It has occurred or at least has been reported far more frequently from Continental Europe than from the United States.

It is more likely to occur during subsequent courses of treatment than during the initial course and it is less likely to occur with the use of arsphenamine.

Second attacks are of greater severity than primary ones and are almost certain to occur if treatment is reinstituted.

Drugs other than the arsenicals may precipitate the condition and combined therapy may be an etiological factor. The true etiological factors or modus operandi are unknown.

The patient described in this report showed a mild tendency to bleeding following an injection of sulpharsphenamine and developed a typical and moderately severe case of purpura hemorrhagica following an injection of neoarsphenamine.

There is no specific treatment for the condition, which seems to run its course to recovery or death.

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DISCUSSION (*Abstract*)

Papers of Dr. Robinson and Drs. Lindsay, Rice and Selinger.

Dr. Udo J. Wile, Ann Arbor, Mich.—We have listened with interest to two dissertations on the unfortunate accidents which we not infrequently meet since the introduction of the treatment of syphilis with arsenicals.

The essayist stated that most of the cases of arsenical dermatitis reported in Baltimore resulted from the injection of old arsphenamine. This is precisely the opposite of my own experience. The largest number of our cases, many of which are sent in to us with dermatitis, have occurred following the use of neoarsphenamine.

I have noted two interesting phenomena. The first is the occasional tendency for an acute dermatitis to subside under treatment with forced fluids and sodium thiosulphate, the patient apparently recovering and then suddenly relapsing with occasionally fatal outcome. The second rather interesting and unexplainable phenomenon is the occasional unaccountable reversal of the Wassermann following a long convalescence from arsphenamine dermatitis. I may say that I have noted this in five or six instances.

I was very glad to hear the essayist state that he did not regard foci of infection as primary causes for arsphenamine dermatitis. I find myself entirely in accord with this view.

I have never seen a case of recovery in which purpura of a severe type occurred following treatment of syphilis with arsphenamine.

It is very important in connection with such cases to be perfectly sure of the differential diagnosis. I have seen two conditions occasionally met with in syphilis in which hemorrhage occurred, which could not be ascribed to the drug.

Hemorrhagic lesions may occasionally develop in syphilis as a result of splenic anemia, due to the syph-

ilitic infection. This condition closely resembles Banti's syndrome.

A second cause of hemorrhage occurring in the incidence of syphilis, very rarely to be sure, is to be found in patients with leukemia, who acquire or have syphilis. Blood studies on such cases, of course, may help in the differential diagnosis.

The condition of the blood in the arsphenamine group of purpuras closely simulates that seen in the so-called aplastic anemia.

Within the last month I have had the opportunity of seeing a severe case of arsphenamine purpura in a patient treated in a neighboring city with neoarsphenamine. He came into the hospital in apparently good flesh, covered with large hemorrhages, with blood in his urine, melena and bleeding from all mucosae, and with an appalling blood condition. Before exitus, he had less than one million red cells and a hemoglobin of about 25 per cent. Transfusions were of absolutely no avail. The patient died, and the post mortem changes in the spleen and bone marrow were those characteristic of an aplastic anemia.

Singularly, there were no changes in his liver, such as one might have expected from arsphenamine intoxication.

Dr. Thomas W. Murrell, Richmond, Va.—I was much surprised to hear Dr. Robinson's statement that the size of the dose had no relationship to the occurrence of the reaction. I understand that at his clinic neoarsphenamine has been given comparatively little compared to arsphenamine. That would explain to a large degree the relative disproportion.

He attributes two of his fatal cases to bismoarsphenamine. The doses of 0.9 grams of neoarsphenamine or of 0.6 grams of arsphenamine were originally prescribed upon the theory of complete sterilization with one dose. They did not carry the idea at all of the continued treatment. We have been trying to get back to the idea of a continued treatment as a factor in medicine. In one of the publications of the government, by five or six prominent men (and I think Dr. Wile was one of the authors of that monograph), I noted a time table of sixteen to eighteen months.

Now, arsphenamine is not the only thing that syphilis was ever treated with; and neither is bismuth. I venture to say that if all of us gather here fifteen years from now we shall be giving much more mercury than we are giving today. And we shall probably be giving a larger dosage.

By watching for the urticaria we prevent the reaction. My experience entirely accords with Dr. Robinson's there.

In the last month a man and his wife came to see me with positive Wassermanns. On the third treatment the wife developed a terrific urticaria. She had eaten some grapes that day, contrary to orders, and she was a heavy eater. Was this an urticaria from grapes or from arsphenamine?

If we watch for premonitory symptoms of these reactions, I think there are hundreds of them that we may avoid.

Dr. Herbert S. Alden, Atlanta, Ga.—Unfortunately, arsenical dermatitis is rather familiar to me. Recently I have been seeing in the neighborhood of 800 to 1,000 patients with syphilis who have been given neoarsphenamine every week. When I came on this service I was called to see seven cases of arsenical dermatitis on the ward. The service had been averaging two to five cases a week. We instituted the use of a 0.6 per cent saline for mixing the neoarsphenamine instead of distilled water. Since this time we have had only two cases of arsenical dermatitis, neither of them very severe.

I think the remarks about the first little danger signs are very *apropos*. We have had many severe cases because neither the patient nor the physician noted the erythema and itching that followed the first few injections, and the patient was given additional treatment resulting in a severe dermatitis sometimes followed by death. The physician should impress the patient with the fact that he should warn the physician of the first appearance of any skin symptoms. If the proper therapy is then introduced the mortality rate from this distressing condition will be lowered.

Dr. V. Pardo Castello, Havana, Cuba.—I have seen a very severe case of arsenical dermatitis following injections of sodium cacodylate. In the tropics many chlorotic girls resort to the cacodylates and sometimes enormous amounts are taken in a few months. In this particular case, daily subcataneous injections of 0.10 to 0.30 were used.

I think the size of the dose has nothing to do with the production of complications. One of my cases of arsenical dermatitis developed after a first injection of 0.30 grams of neoarsphenamine. Also a case of serous encephalitis, terminating fatally, supervened after two doses of 0.30 and 0.45 grams of the same drug. Reducing the amount of the drug injected will not diminish the number of accidents.

Dr. J. L. Kirby-Smith, Jacksonville, Fla.—Six years ago at the annual meeting of our Section in Washington, D. C., Dr. Marshall, of Memphis, read a paper on arsphenamine reactions. In the discussion of this paper, I called attention to a very severe reaction that had occurred in my private practice. An ampoule of old arsphenamine had been given by mistake for a neopreparation. Six-tenths of a gram of this arsenical had been dissolved in 5 c. c. of water and given intravenously without previous alkalinization. A very severe immediate reaction was noted. The patient during the next several weeks developed purpura hemorrhagica, pneumonia, and an acute nephritis.

Some of the violent arsphenamine reactions may be attributed to an error in the technic of treatment.

In the early period of the administration of arsphenamines in syphilis, we encountered a number of arsphenamine reactions, most of these no doubt due to our own imperfect method of treatment, and the preparation and variations in the chemical itself.

During the last ten years, I have used the neo-preparations exclusively, both in my office and clinic. In my office I can not recall a single case of arsphenamine dermatitis of any severity, other than the case mentioned. But in my hospital service and clinic, and in consultation with other physicians, I have seen a number of cases of severe arsphenamine dermatitis, varying from a mild exfoliative dermatitis to a severe bullous eruption resembling pemphigus. I found that most of these cases were due to excessive treatment, usually in the hands of an inexperienced syphilologist. An arsphenamine dermatitis is caused by overdosage

with arsenic. In veneral disease clinics, treatments given by nurses and internes often result in severe arsenical irritations.

Dr. Earl D. Crutchfield, San Antonio, Texas.—It seems to me we cannot say offhand that arsenic or arsphenamine is the cause of arsphenamine dermatitis. There has recently crept into dermatological thought and conversation the belief that small amounts of arsphenamine or neoarsphenamine, either by liquid in the vein, or perhaps from small amounts on the needle which get into the skin, sensitize patients to arsphenamine. We have been noticing and carefully questioning all of our patients with dermatitis exfoliata; and in the last eight months, during which we have had five or six cases, we have found that all of them have had some small amount of infiltration into the skin. I wonder whether this has been the experience in charity patients, and whether sensitization or allergy may play a part in this terrible complication?

Dr. Robinson (closing).—Replying to Dr. Kirby-Smith, I wish to state that four of the patients who had a dermatitis immediately after neoarsphenamine were non-syphilitic. Our maximum dosage of 0.4 and 0.3 gram arsphenamine is not given to all of our patients.

In regard to the amelioration of the syphilitic infection by an attack of arsphenamine dermatitis, which Dr. Wile mentioned, I did in some cases notice a reduction in the Wassermann from positive to negative, but in several of the cases I had to resort to further treatment. There were both serological and clinical relapses after an attack of dermatitis; one of the patients developed a rupial eruption, which necessitated resumption of active treatment.

I think my figures more or less agree with Dr. Wile's in that I have used so little neoarsphenamine that my incidence of dermatitis, due to arsphenamine, is artificially high as compared with neoarsphenamine. Practically all of the patients who developed dermatitis after neoarsphenamine have been patients treated elsewhere who came under my observation on account of the dermatitis.

I hardly know what to say with regard to reverting to mercury. I do give mercury to my patients, but only after I find they cannot tolerate any of the arsenicals. In such cases I usually give alternating courses of bismuth and of mercury.

Dr. Selinger (closing).—I do not believe that this patient could have been afflicted with leukemia or splenic anemia. None of the symptoms of either condition was present unless the hemorrhagic manifestations might be so considered. The abruptness of their onset, however, and their apparently very definite relationship to the administration of arsenic on this as well as on a previous occasion would seem to point to the original diagnosis offered. Whether or not one or another of the conditions mentioned by Dr. Wile could be present in their incipiency, only time will tell.

I do not take credit for the recovery of this patient. It is true that he made a complete recovery, but it was just as possible that he might not have. In closing, I should like to repeat, that there is no indication in the literature, or elsewhere, of any specific treatment for this condition.

URETERAL ANASTOMOSIS*

By RUSSELL A. HENNESSEY, M.D., F.A.C.S.,
and
ALFRED D. MASON, M.D.,
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The development of conservative measures in urological surgery is indicated by numerous articles appearing in the literature concerning plastic operations upon the kidney, pelvis and ureter. Occasional reports of successful attempts to repair the damaged ureter began with Shapf in 1887. Lack of investigative facilities made difficult the determination of their results. The subsequent clinical course cannot be accepted as an index to the success of the procedure, since renal deterioration may occur gradually and become complete without showing convincing clinical signs. Bouchard and Laquiere reported a case in which ureteral repair had been accomplished nineteen years before. A marked hydronephrosis and dilated upper ureter were later found. McEachern, on the other hand, cited a case in which no dilatation of the kidney pelvis or ureter was found, seven years after a modified

Fig. 1
Ureterogram showing left flank fistula, after drainage of ureteral extravasation.

*Read in Section on Urology, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

*From the Department of Urology, University of Tennessee, College of Medicine, Memphis, Tenn.

Fig. 2
Pyelo-ureterogram taken eighteen months following successful anastomosis and recovery of patient.

Van Hook operation had been done. Preservation of the renal integrity was shown by the appearance of indigo carmine from either ureter within five minutes. Gouverneur and Marion question the efficacy of ureteral repair. They state that section and suture of the ureter is always followed by an ureterohydronephrosis, which occurs as a result of faulty ureteral contractions and not because of obstruction at the site of repair. Iselin is equally firm in his opinion that stenosis is the cause of ureteral inertia. He concludes that the ureteral paralysis following section affects only the central end, and that this paralysis disappears and motility returns later if there has been no development of stenosis at the line of suture. He further states that ureteral paralysis of itself has no effect upon the kidney, but that the cause of the renal damage is the secondary dilatation following the development of stricture and leading to an atony by distention. He cites numerous successful cases and recommends accurate methods of surgical technic. McArthur, in 1925, presented a technic for repair of the ureter modeled after a method used in reconstruction of the common bile duct. This method involved the use of an inlying bougie as an ureteral splint, with diversion of the urinary stream by pyelostomy. Even with the loss of considerable ureteral substance, this was followed by epithelization and re-establishment of the continuity and patency of the ureter. The value of this method of repair seems to be confirmed by the experiences of Curtis, Kramer, Bump and Crowe, Iselin and the clinical and experimental data presented herein.

CASE REPORT

Mrs. D. C., age 54 years, was first seen December 18, 1926, because of pain in the left hypochondrium, chills, fever and frequent, painful micturition. Her complaint began two days before, following a cystoscopic examination, at which time the left ureter was dilated.

The patient had suffered attacks of bladder trouble for three and one-half years. The right breast had been removed for malignancy six years before and the left one three years later.

A deep, diffuse, brawny induration was found in the left hypochondrium adjacent to the interior iliac crest and extending backward into the flank. The temperature was 101.6° F. The blood count showed 3,800,000 red cells and 16,200 leucocytes with 86 per cent polymorphonuclears. Cystoscopic examination showed a diffuse subacute cystitis. The left ureteral orifice was edematous. An occasional feeble contraction of the left ureter was seen, but no urine was ejected. Indigocarmine failed to appear from the left orifice in twenty minutes. The appearance time and concentration were normal for the right kidney.

Under nitrous oxide and oxygen anesthesia, an incision

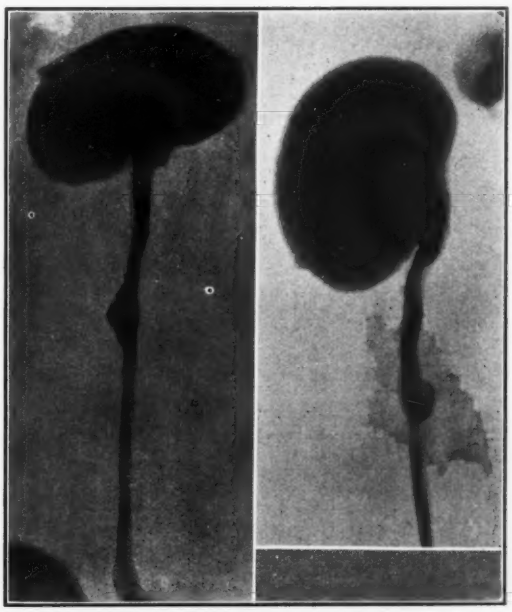

Fig. 3 Fig. 4
Specimen removed from dog in which successful anastomosis had been done.

Fig. 5
Cross section of kidneys removed from animals from forty-five to sixty days following anastomosis.

was made over the left iliac crest. Beneath the muscles a large pocket of urine was released, drainage tubes were inserted and the incision closed. The tubes were removed in six days, after which an active urinary fistula persisted (*Fig. 1*). The improvement of the patient was rapid. Two weeks later indigocarmine given intravenously appeared five minutes later from the fistulous tract in good concentration. Although nephrectomy seemed imminent it was determined to attempt an ureteral repair. An ureteral catheter was passed about 18 cm. from below to aid in identifying the ureter. Through a liberal flank incision the upper ureter was followed from the kidney pelvis and isolated. The lower ureter was identified an mobilized. Through a vertical incision in the dilated upper ureter a bougie was passed downward and into the lower ureter. A large ureteral catheter was passed upward through this incision into the kidney pelvis. The divided ureter (the separation of the ureter was most probably made complete during dissection in the dense scar tissue), was sutured end-to-end with two fine catgut sutures over the inlying bougie. The tube draining the kidney pelvis was removed on the fifth day and the inlying bougie two days later. There was considerable drainage from the incision for three weeks, but the amount of urine decreased gradually after the eighth day. Healing was complete in thirty-two days. Dilatation of the ureter with number 9 and 11 Garceau catheters has been carried out at intervals since. A recent determination of the functional capacity showed a 'phthalein return in three minutes from both sides, and an output of 14 per cent and 12 per cent from the right and left sides, respectively. A recent pyelogram is shown in *Fig. 2.*

EXPERIMENTAL DATA

These data were gathered from 14 dogs upon which ureteral anastomosis was attempted. The method used was that described by McArthur and used by Kramer and others, except in control animals in which an end-to-end anastomosis was done without the use of the inlying bougie. Ether anesthesia was used. The flank was shaved and prepared with iodine and alcohol. An oblique flank incision from the costovertebral angle was made through the skin, fascia and muscles. The ureter was isolated and stripped of adjacent fat. In several instances the peritoneum was opened, but was promptly closed. The ureter was divided at some point below the kidney pelvis and above the pelvic brim. In several instances a section of the ureter measuring from one-fourth to one inch was excised. Through a small vertical incision in the upper ureter, a bougie was passed downward and into the lower segment bridging the severed ureter. An ureteral catheter was passed upward through this incision into the kidney pelvis. The divided ends of the ureter were united over the bougie with two or four fine catgut

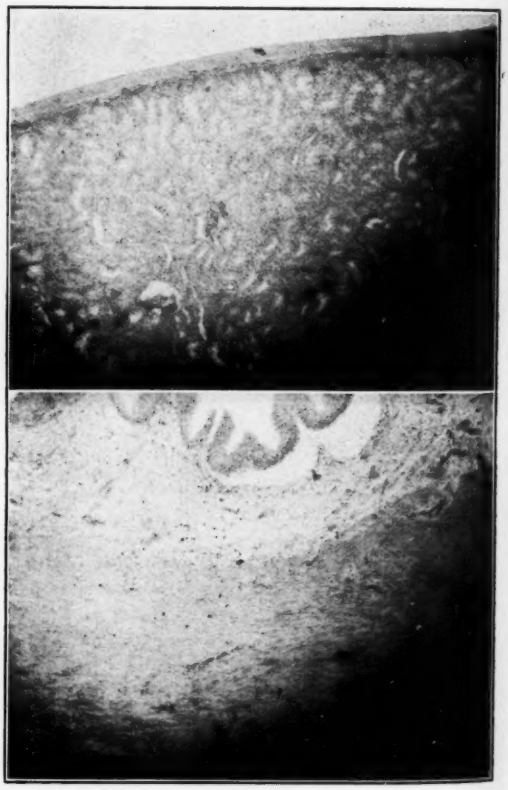

Fig. 6 (top)
Fig. 7 (bottom)
Photomicrographs of kidney in successful anastomosis of ureter.

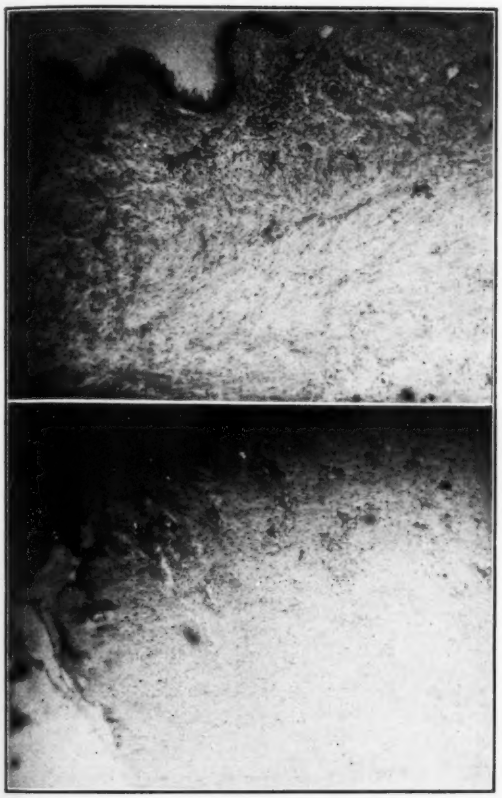

Fig. 8 (top)
Photomicrograph of kidney following faulty anastomosis. Specimen A.

Fig. 9 (bottom)
Photomicrograph of kidney following faulty anastomosis. Specimen B.

sutures. In the instances where reapposition was not possible because of the loss of ureteral substance by excision, approximation was attempted only by passing tension sutures through the ureteral muscles and contiguous tissues. In several such instances the result was remarkably successful and healing occurred with a surprisingly small amount of scar tissue and stenosis. A small cigarette drain was placed down to the ureter and the incision closed in layers. The catheters were removed by accident or design in from two to seven days. Healing occurred in the majority of animals in three to four weeks. In periods ranging from four to eight weeks the animals were again etherized and through a ventral incision the condition of the anastomosis and the conduct of the ureter observed.

PHYSIOLOGICAL CONSIDERATIONS

An attempt was made to observe the physiological conduct of the ureter, especially when the operative technic and postoperative management varied. It appeared that the results were, to a considerable extent, dependent upon the amount of stenosis developing at the site of the anastomosis, for in those instances in which the degree of stenosis was small the contractions of the ureter were observed to pass into the lower ureter with but little interruption. The contractions were frequent and vigorous above the point of repair and little evidence of hydronephrosis or renal damage was present. On the other hand, when considerable stenosis was present because of faulty technic or in control animals, the contraction waves were frequent and feeble in the dilated ureter above the anastomosis and very sluggish below. In an effort to record the rate and vigor at different levels of the repaired ureter, an inflatable bulb catheter was passed and attached to a water tambour. The tracing shown (*Figs. 10 and 11*) was obtained from an animal in which only a small amount of stenosis had occurred. While the rate and strength of the contractions below the anastomosis would suggest some degree of interruption of peristalsis,

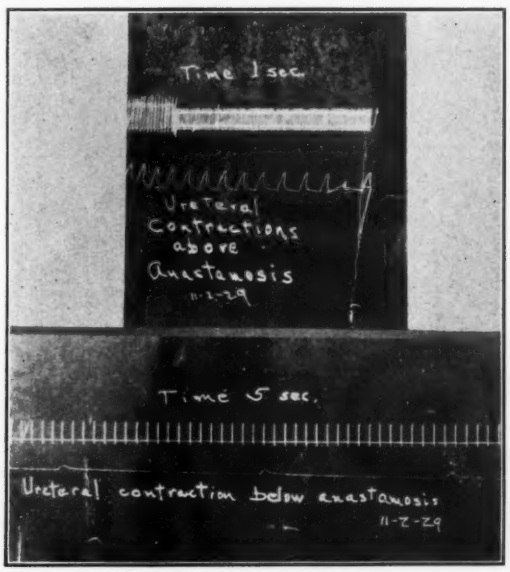

Fig. 10 (top)
Record of ureteral contractions above anastomosis. (Contractions recorded with inflatable bulb catheter and water tambour.)

Fig. 11 (bottom)
Rate of ureteral contractions below anastomosis in successful anastomosis recorded sixty days after operation.

dilatation of the kidney pelvis and evidence of renal damage was absent (specimens 2, 4, 5, in *Fig. 5*). In contrast to these marked renal damage is evident in the cross section and reflected in the photomicrographs (*Figs. 8* and *9*). The most satisfactory end results were obtained with the removal of the inlying bougie on the fourth and fifth days.

CONCLUSIONS

(1) Ureteral anastomosis is a valuable procedure that should be utilized more generally in injuries of the ureter. It is conceivable that it may be of use in the treatment of certain diseases of the ureter.

(2) The use of the inlying bougie is essential to the diversion of the urinary stream and the successful epithelization of the ureter.

(3) Successful ureteral anastomosis may be accomplished even with the loss of as much as an inch of ureteral substance.

(4) Subsequent ureteral dilatation should be done to prevent contraction and conserve renal integrity.

(5) The success of ureteral anastomosis appears to be dependent upon the degree of stenosis developing at the site of repair.

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DISCUSSION (*Abstract*)

Dr. C. C. Higgins, Cleveland, Ohio.—The majority of cases of injury to the ureter during operation have occurred during surgical operations for pelvic disease, for resection of the colon, and for removal of retroperitoneal tumors. In fact, one of the first cases in which a satisfactory end-result was secured after anastomosing the severed ureter was reported by Kelley in 1897. In this case the ureter was injured during the removal of a retroperitoneal tumor. Four years later the junction with the kidney was normal.

As Dr. Hennessey has stated, a diversity of opinion exists as to the mode of procedure if the ureter is accidentally severed. What advice should be given to the gynecologist and general surgeon if during the course of an operation a ureter is injured? Secondly, what experimental and clinical evidence justifies such advice?

Now it has been contended by the French, German and South American urologists that if the ureter is severed the kidney is, for all practical purposes, of little value as far as a restoration of function is concerned. This conclusion seems hardly justifiable in view of case reports of successful anastomosis and animal experimentation.

Should a nephrectomy be performed as they advocate when a differential functional test of the kidney has not been done?

Only recently while performing a cholecystectomy and exploring the abdominal viscera, I found one large kidney, a compensatory hypertrophy present upon one side, and a small hypoplastic kidney on the other. Certainly if the ureter had been injured during the course of an abdominal operation on the side with the large kidney, and the kidney had been removed subsequently, death from renal insufficiency would have ensued.

Furthermore, it is frequently stated that if the ureter is ligated following injury, primary atrophy of the kidney occurs. In view of experimental evidence this is an erroneous conclusion. Following ligation, dilatation occurs followed by secondary atrophy which is entirely different from primary atrophy.

If we sever the ureter of a dog, what occurs physiologically? Immediate cessation of peristaltic waves does not occur. The peristaltic waves become perhaps slightly more sluggish and pass from the pelvis toward the point of severance, as has been observed in dogs.

From twenty-four to thirty-six hours after the severance of the ureter no evidence of peristaltic waves passing downward from the pelvis of the kidney can be graphically recorded, and stimulation with an electric current does not provoke a contraction.

In the dog, however, in about four days faint peristaltic waves again may be seen passing downward from the pelvis. This occurs on the third day in rabbits.

Thus for about one week after severing the ureter and then re-anastomosing it, a cessation of peristalsis occurs in the central portion of the ureter. Faint, sluggish peristalsis remains in the distal segment.

Now the end-result depends on the condition of the ureter at the point of anastomosis. If stenosis occurs at the line of suture, dilatation of the ureter and hydronephrosis occur with later secondary atrophy of the kidney.

If stricture is prevented by postoperative ureteral dilatations, then in six to seven weeks normal peristaltic waves are present in the ureter. Iselin found normal peristalsis at the end of seven weeks.

In Dr. Hennessey's cases dilatations of the ureter were performed postoperatively, which I believe accounts for the prevention of stricture at the line of anastomosis, and the maintenance of normal kidney function.

In view of these findings, I believe ureteral anastomosis should be attempted. One point which I believe is of importance in the performing of the anastomosis is that when the ureter is severed if the redundancy of the mucous membrane is excised a better approximation of the ureter can be secured.

Iselin recommends pyelostomy, but believes this is unnecessary if adequate postoperative dilatation of the ureter is performed.

Many cases have been reported in which this gave satisfactory results, namely, by Frederick, Reed, Chance, and others.

Dr. Lawrence R. Wharton, Baltimore, Md.—Last night I heard ureteral anastomosis likened to "the triumph of hope over experience." Most of the ureteral anastomoses have failed in the past, and in failing, one of two things has happened. In the first place, the anastomosis has broken down, to be followed by fistula, hydronephrosis, pyonephrosis and usually nephrectomy. Or, in the second place, after the anastomosis has healed, stenosis develops with hydro-ureter, hydronephrosis and loss of renal function. In either case the result is a failure.

Why have we had such poor results with ureteral anastomosis?

A good many cases have been examined by Dr. Hennessey: the fact that the operation usually has to be done under unfavorable circumstances, often in the presence of infection, with loss of substance of the ureter and consequent tension of the anastomosis. To obviate these difficulties various types of operations have been devised, almost as many as there are for intestinal anastomosis.

Regardless, however, of the circumstances and of the type of operation, practically all ureteral anastomoses until the last few years have failed. This makes us wonder whether some fundamental surgical principle has not been violated in doing ureteral anastomosis.

Within the last two or three years the question has been clarified, I believe, a great deal by the contributions of McArthur, Ireland, Bump and Crowe and lastly by Hennessey. I believe that the essential principle is the diversion of the stream of urine. This is not a new principle in surgery and is not new in urology. If a surgeon anastomoses the sigmoid, he diverts the stream of feces by a colostomy, and often splints the bowel over a large rubber tube. A complicated plastic operation upon the urethra is likewise accompanied by suprapubic cystostomy which diverts the urine and puts the urethra at rest and allows it to heal. Otherwise we should not expect these operations to succeed very frequently. This principle has not been utilized in performing ureteral anastomoses until very recently, and therefore success has not been very often observed. It is not strange, also, that in the last few years we have had greater success in performing ureteral anastomosis since we have utilized this principle.

Dr. Hennessey has shown one of the ways in which this can be carried out. A longitudinal incision is made in the ureter above the anastomosis. Through this incision, two catheters are passed into the ureter, one downward through the anastomosis to splint the ureter, the other upward to the kidney pelvis to divert the urinary stream. Recent experience in several cases both in dogs and human beings, makes us feel that we can approach this type of operation with fair hope of success.

The second type of operation involves the use of a pyelotomy through which the urine is diverted. The pyelotomy will, of course, close very quickly if the uretero-pelvic junction is not blocked by a bougie. This procedure also has proved successful in several cases in the past few years.

Consequently I feel more hopeful about ureteral anastomosis in the future and also agree with Dr. Hennessey that if a ureteral anastomosis is to be done, the chance of success is a great deal brighter if the stream of urine is diverted and the ureter is splinted by a catheter which is large enough to preserve a normal lumen. Also I feel that we should not judge results too quickly; and as Dr. Hennessey has said, we should follow these cases a long time in order that we may detect early evidences of beginning dilatation or stenosis and institute the proper treatment to preserve the function of the kidney.

Dr. W. Houston Toulson, Baltimore, Md.—I was particularly interested to know how Dr. Hennessey keeps this inlying catheter in position. You know how difficult it is to leave a catheter in the ureter for a long period of time, and occasionally impossible to keep a catheter in as a retentive measure. I should like to ask Dr. Hennessey if I understood him correctly when he said that this operation can be done where there is a loss of as much as an inch in the continuity of the ureter.

Dr. Hennessey (closing).—With the fixation of the inlying catheters, of which Dr. Toulson spoke, we have had little difficulty, except in dogs. Many experiments which we had hoped would be successful were ruined by the animal's pulling the bougies out. In all cases we have fixed the catheters by tying them in the posterior angle of the incision. Liberal drainage was provided down to the line of anastomosis. This appears to be an important item, since we did not experience any great difficulty with the perirenal and perureteral infection encountered by many other experimenters.

UNUSUAL SALIVARY GLAND TUMORS*

By ELLIS FISCHEL, M.D.,
and
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In a perusal of the literature describing salivary gland tumors, it is noted that a great majority of clinicians and pathologists have classified them under the heading of inflammation and, as Ashurt has cited in recent communications, most of these inflammations are the result of obstruction of the salivary duct. The usual obstruction in the salivary duct is a stone or calculus.

Some cases have been cited wherein definite obstruction of the duct or the presence of calculi in the gland itself cannot be made out. The nature of the pathology in the salivary gland in any of these cases depends upon the length of time during which the obstruction has been present and also the extent of the obstruction. With complete obstruction there is an entire glandular atro-

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phy. With partial obstruction the intercurrent inflammation of the gland has led to varying degrees of atrophy of the glandular substance, the amount of the atrophy depending upon the actual amount of inflammation which has taken place. Especially with the partial obstruction, where there is a definite calculus present, and also with the complete obstruction of the duct, the removal of the calculus allowing adequate drainage from the salivary gland produces relief in a great number of cases. However, when no definite obstruction in the duct can be made out and when no definite calculus can be observed in the gland itself, either by probing or by radiograph, it is a logical method of relief to remove the salivary gland. We have had in our practice of recent date two submaxillary salivary glands which have been of interest. Both of these salivary glands were removed for the reasons which were cited above.

One case was that of a male, age 53, coal miner, who states that at the age of thirteen years his jaw became swollen on account of a bad tooth and pus came out of a hole in the cheek for a period of six months or more. He had no trouble with the jaw since that time until three months previously, at which time his jaw felt sore and he felt a tiny lump which gradually increased in size. At the time of examination he was not able to open his jaw more than an inch, and there was a definite trismus. On examination there was a mass on the mesial surface of the jaw in the lower molar region, extending into the floor of the mouth and evidently connecting with the mass visible in the left submaxillary region. The skin was adherent to the bone in the left submaxillary region, one inch anterior to the angle of the jaw. The submaxillary triangle was filled with a hard tumor mass. On pressure upon the submaxillary mass there was a free discharge of creamy yellowish pus from the submaxillary duct. The submaxillary salivary gland was removed in the usual way; it was found that the dimple in the skin was due to adhesion of the skin to the border of the mandible, and was not connected with the submaxillary gland. Grossly the submaxillary salivary gland presented an interesting picture, measuring 4x3x2 cm. On section through the gland there was a foreign body in the center. This foreign body was 2 cm. long and 1 mm. in thickness. It was yellowish in color and made up of four strands. It lay in an abscess cavity extending along the length of the foreign body, measuring from 2 to 5 mm. in diameter. The exact nature of this foreign body was not discernible, but it was apparently a bristle of some type (*Figure 1*). Sections were made of the gland and the microscopic picture was that of a chronic inflammation extending throughout the whole of the gland, with a marked amount of fibrosis interlacing the glandular structure. All of the glandular structure was atrophied, none of the acini having the picture of normal salivary gland structure. An uneventful postoperative course followed the removal of the gland.

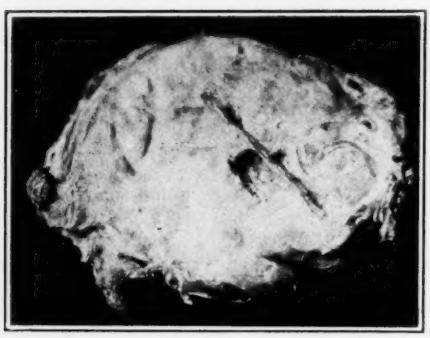

Fig. 1

Photograph of cut surface of salivary gland sectioned in half, showing foreign body and abscess formation. The foreign body is made up of four strands of yellowish material, with a total diameter of 1 mm.

The second case was that of a male, age 52, a tailor, who stated that six months previously he noticed swelling and pain in the right submaxillary region, with distinct variation in size of this region from time to time. At that time a calculus was removed from the right submaxillary duct, but the symptoms were not relieved. Another complaint was that of pain along the right side of the tongue. This pain was made more severe by pressure over the submaxillary gland. Upon examination by us the right submaxillary salivary gland was found to be hard, not appreciably enlarged, and only slightly tender to pressure. A probe was inserted the length of the duct and no calculus was encountered. The tongue showed redness and atrophy of the papillae along an area to the right and lateral of the tip. The submaxillary gland was removed close to its capsule with a portion of the duct for a distance of 1.5 cm. distal to the gland. The lingual nerve was injected with 70 per cent alcohol. Upon opening the gland a calculus measuring 6x3 mm. was exposed in the depth of the gland. On microscopic section there was noted an acute and chronic inflammatory process extending throughout the structure. An uneventful postoperative course followed the removal of the gland, the pain in the tongue having subsided to a marked extent.

Both of these cases present some unusual features. In addition to the rather extraordinary nature of the foreign body present in the first described tumor, the marked firmness to palpation had caused a physician to consider this case as malignancy. The mode of advent of the foreign body into the submaxillary salivary gland in this case is a question to remain unsolved.

The second case is interesting from the standpoint of the presence of multiple calculi in the salivary gland. If symptoms do not abate after the removal of a calculus in a duct, one should be certain that no more calculi are present before a prognosis is given.

CONCLUSIONS

These two cases of salivary gland enlargement present rather unusual features in regard to etiology. Radiographs are very important from the standpoint of differential diagnosis in these conditions.

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RAMSTEDT OPERATION WITH MODIFIED TECHNIC FOR LOCAL ANESTHESIA*

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While the Ramstedt operation for congenital pyloric obstruction in the infant is fairly well established and universally accepted as the operation of choice, there is still some discussion as to the best type of anesthesia, both general (ether) and local (novocaine) having their advocates. The principle objections offered to local anesthesia are, first, the danger of evisceration in case the infant cries; second, the difficulty of locating and delivering the pylorus when the child is straining; and third, the difficulty in securing a tight closure. Fortunately, the psychic element is a negative factor in the infant. Hence, if the mechanical difficulties, as listed above, can be adequately met, the problems of local anesthesia in this operation are in a large measure solved. The belief that these difficulties have been overcome is our excuse for describing this technic.

After the infant is bound in a sheet and pinned to the operating table, and the field of operation has been prepared and draped, the line of incision is infiltrated with 0.5 per cent novocaine. The incision which is approximately 3 cm. long begins at the costal margin just to the right of the midline. After the skin has been incised, the deep injections into the muscle are made. The deep injections are purposely made through the skin incision as a precaution against possible contamination when the needle is passed through the skin. The fibers of the rectus muscle are split by blunt dissection and the posterior sheath and peritoneum are thoroughly infiltrated and the abdomen opened. The incision is made in this location for three reasons: first, in order that the abdomen may be entered above the transverse colon, thereby minimizing the possibility of a post operative obstruction in the small intestine; second, in order that the peritoneum may be opened over the dilated stomach, which immediately plugs the incision, and in case of straining prevents evisceration; and third, in order that the falciform ligament can be used in closing.

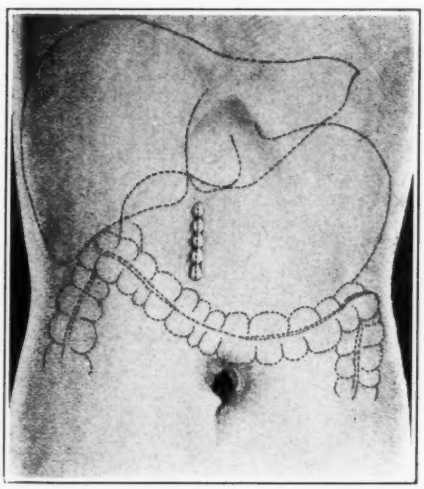

Fig. 1
Showing the line of incision infiltrated.

As shown in *Fig. 2*, the wall of the stomach is grasped by Allis forceps, the teeth of which have been filed to a dull edge. (It is necessary to handle the stomach with forceps, as the incision is purposely made very small.) This fixes the stomach in the wound. The head of the table is now lowered and the stomach is emptied by catheter as shown in *Fig. 3*, and the head of the table is again raised. The stomach having been emptied of gas, can now be displaced to the left without undue force, and as the stomach is displaced to the left by the first clamp, the second catches the stomach toward the pylorus and the stomach is again rotated to the left, as shown in *Fig. 2*. This manoeuver

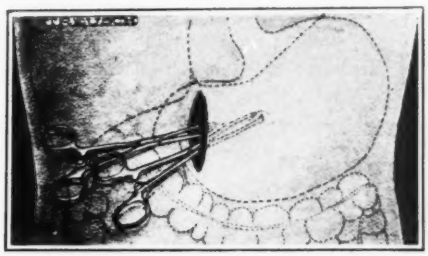

Fig. 2
Showing the way in which the stomach is rotated toward the left. The second clamp has been applied, and the first clamp is about to be removed, and will be used to grasp the stomach again toward the pylorus.

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*From the Surgical Department of Emory University.

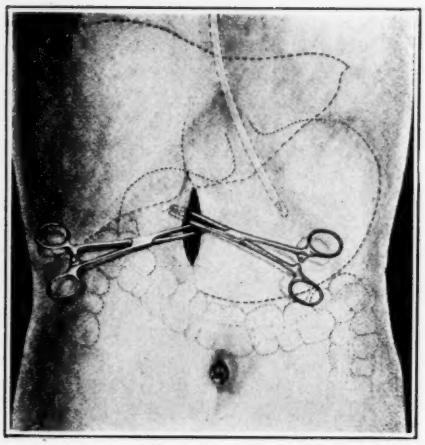

Fig. 3

Catheter has been introduced into the stomach to empty it of gas, and the second clamp illustrates how the stomach is grasped toward the pylorus. As the handle of the forceps is rotated to the right, the stomach is displaced to the left, bringing the pylorus nearer the wound.

is repeated until the pylorus presents itself in the wound. Care is taken at all times to keep the incision well plugged by the wall of the stomach. As shown in *Fig. 4*, when the pylorus presents in the wound, the index finger of the left hand is slipped under the pylorus to support and fix it in the upper angle of the incision. The muscle is cut in the long axis of the pyloric ring, and with a pair of blunt scissors or forceps is gently pushed back, allowing the mucous membrane to protrude in the line of incision. If a small vessel, which at times crosses the line of incision, is cut, this is ligated by the assistant. Following this, the pylorus is allowed to drop back into the abdominal cavity and the incision is immediately plugged with a warm sponge, which is gradually removed as the peritoneum is closed.

The falciform ligament is now made use of, as shown in *Fig. 5*. The peritoneal suture which is begun at the upper angle of the wound, is passed through the falciform ligament, and as it will easily stretch, it can be brought over and sutured to the peritoneum of the opposite side without tension, even though the child is crying. By making use of the falciform ligament in this way, a tight peritoneal closure is easily accomplished, overcoming the third difficulty encountered in the use of local anesthesia in this operation. The fascial suture is now placed, and interrupted sutures in the skin complete the closure. For additional support, the wound is firmly strapped with strips of sterile adhesive.

While this technic has been used in only a small series of cases, it adequately overcomes the objections offered against local anesthesia, and is commended to those who feel that local anesthesia offers an additional element of safety when operating upon these infants, who may be poor risks for any type of general anesthetic.

Fig. 4

The pylorus has been brought into the wound, and is held in position by the index finger of the left hand while the muscle is cut.

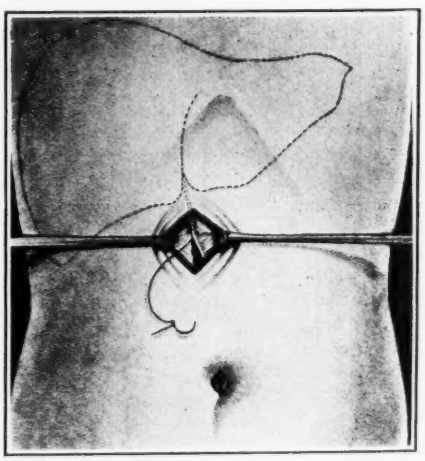

Fig. 5

The falciform ligament is being sutured to the peritoneum of the right side of the wound. This is easily done without tension.

CONSERVATIVE GYNECOLOGY*

By GUY L. HUNNER, M.D.,†
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The material changes that have come about in our social lives in the past fifty years have been so profound and so startling that we instinctively ask ourselves: What does it all mean, what of the future?

A recent book entitled "Whither Mankind?", edited by Professor Charles A. Beard, represents the effort of a number of our leading philosophers to take stock of our losses and gains during the recent eruption and the overwhelming spread of the volcanic forces set free by the evolution of science, which have resulted in the production of what has been termed "the machine age."

Although it must be recognized that we have had temporary losses in spiritual and cultural values, and although there may be a note of pessimism over our inability to keep step with the revolutionary progress of our material activities, despite our attempts at timely readjustments of our educational, economic, social and international relations, nevertheless, the dominant note still seems to be one of optimism. Not only is the average man of today on a higher plane physically, mentally, and spiritually than his ancestors of half a century ago, but our philosophers, our leaders in science, and our captains of industry are taking an increasing interest in the solution of those intricate problems affecting human welfare which have been engendered by the swiftly developing machine civilization.

What account has medicine to render of her stewardship during this period of unprecedented development? Pasteur, Koch, Lister, and their disciples of the past half century have made a record of which we of today are justly proud. In fact it is the control of tropical diseases, and of many of the plagues of the past that has made possible much of our material progress, particularly by the setting free of world commerce and intercommunication. Think of what betterments in the industrial progress of our own country are due to the gradual stamping out of such diseases as tuberculosis, typhoid, malaria and hookworm.

Just as we have seen attending the evolution of the machine age, so with our glorious and rapid progress in medicine there have developed serious problems, many of them of a social and economic nature, and many of them as a direct consequence of the very speed of our development, which has left us but scant time for the desirable readjustments in our broader social relationships. It is hopefully anticipated that when we have learned to apply to our social, legal, and international problems the same impartial and searching scientific methods which have done so much for the success of the machine age, big business, medicine and hygiene, we shall make rapid progress in humanizing our complex social conditions.

Among the more spectacular triumphs of the past half century in preventive and curative medicine have been those of surgery. Being spectacular, they have made a special appeal to the lay mind. Even as lately as thirty years ago it was often difficult to persuade the patient in dire need of an operation to enter the hospital. Today the layman's almost superstitious faith in operation, as the rapid and sure cure for all physical ailments, is such that it gives rise to some of our most serious problems in surgery.

I believe every serious and conservative surgeon of experience who has at heart the welfare of the public no less than that of our guild, must agree that a vast amount of the operating of today is unnecessary and cannot be classified as true and lawful surgery. In the treatment of this problem we do not need sensationalism, nor do we need to expose ourselves to the charge of being carping critics. Facing the problem honestly and dealing with facts from our daily experience should suffice to make each surgeon, worthy of the name, more thoughtful in his daily activities, and this in turn should have its restraining influence on those who are inclined to underestimate or refuse to meet honestly the great responsibilities of our profession.

What are some of the factors leading to useless or ill-advised operations? In the first place, but that is no excuse, the public psychology is now such that not infrequently the surgeon is importuned to operate, even before he has had opportunity to make a thorough investigation of the patients' condition, and to reach an unbiased opinion as to whether or no an operation is indicated. This attitude brings its problems

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*From the Gynecological Department of the Johns Hopkins Hospital.

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to even the best trained and most conscientious surgeon; and the younger members of our ranks who have their spurs to win and realize that prestige often grows faster with the glamor and excitement of sending patients to the hospital for operation, may be tempted to follow this course rather than try to restore the patient by less spectacular, far more tedious and painstaking, but often more efficient methods of conservative treatment.

Secondly, some so-called surgeons are following the art as a business rather than as a profession. Some of these are honest enough to disclaim all altruistic motives and boast that they are in the game for its cash returns. Others in this class enhance their business activities by a more or less close association with individuals of similar low ideals who are in general practice, and who see no harm in exploiting the patient for pecuniary gain.

While there can be no question concerning the great progress made by the American College of Surgeons in its attempt to clean house from within our professional ranks, rather than have the fee-splitting disgrace extend until it becomes a target for our state legislatures, yet we wish we could feel that there exists less ground for the cynical talk we are still compelled to hear concerning members of our profession, some of whom, I regret to say, are already in the College of Surgeons.

Thirdly, there are too many men attempting to do surgery who are totally unfit for the grave responsibilities involved, either because of lack of natural endowments, of adequate training, or of both. Some of the most capable surgeons I have known have lacked an early thorough training in pathology and the art of surgery and have found after years of general practice that their tastes, and a real need in their community, have led them into surgery. Such men, however, have had the conscience and stamina to place themselves under the masters until they have made up for their early lack of special training, and gradually they in turn have become masters. Moreover, their early years in general practice have contributed substantially to their acumen in diagnosis, judgment as to when surgery is necessary and as to the limitations of the individual patient during operation, added to a keen appreciation of the delicate problems incident to the postoperative care. It has been my observation that such late developing master surgeons have been hard working, conscientious, keen, and successful general practitioners before they turned to the lure of surgery. Surely, they present a marked contrast to the army of would-be surgeons who decide upon this course without preliminary special training and without a wide experience in any branch of medicine, simply because a new hospital has been built in their community, and their business instincts suggest that surgery presents an easier and more lucrative calling than general medicine.

Fourthly, but while we are all forced to subscribe to the thesis that much of our present day useless and ill-advised surgery springs from the above unlovely factors which have crept into our professional activities, we must also admit that many useless operations are being performed daily by our best trained and most conscientious surgeons. There is not a surgeon with broad experience today who cannot recall more than one instance in which operation was followed by results that made him admit that the patient would have been better off without any operation, or with one of an entirely different nature.

What are some of the factors leading us into these errors of diagnosis? I think we shall all admit that many of them are due to haste. Our machine age is characterized by speed, and successful surgeons are usually busy men, and it is not unnatural that their better judgment should be influenced at times by this speed mania of the day.

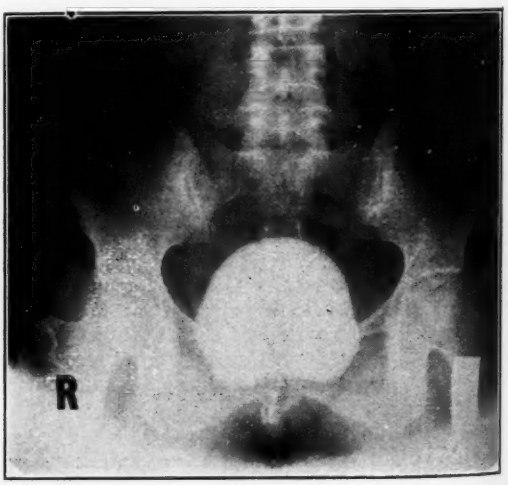

Fig. 1
Cystogram showing bladder content of 140 c. c. sodium iodide. Note silver wire sutures in vagina.
(See case report on page 736.)

It is not an uncommon practice for the general practitioner to send or bring a patient to the surgeon with a diagnosis already made; a cursory investigation seems to confirm this diagnosis, and the patient is operated upon twenty-four hours after entering the hospital. We might save many needless and erroneous operations by following a more deliberate program.

Most patients facing the necessity of an abdominal operation (providing the condition is not clearly acute nor progressively growing worse) are better off with a preparatory week of rest in bed in the hospital before operation. This gives opportunity, in most gynecologic cases at least, to make all the special investigations that may seem indicated for arriving at a complete diagnosis. The patient often argues that she can neither devote this extra time nor meet the expense involved in this program, but the experienced surgeon can easily meet these arguments with the assurance that the total time spent in the hospital will be but little, if at all, prolonged. He knows that thanks to this preliminary preparatory week in bed the patient's muscles, tendons, and joints become accustomed to the prone restful position, and as a consequence the post-operative aches and pains are far less severe and less prolonged than is the case if the patient is submitted to operation within twenty-four hours of an active life. The excretory functions, especially those of the bowel and the urinary bladder, become accustomed to action under the conditions of general repose, and the unhappy post-operative sequelae of bowel distention and urinary retention are much less likely to supervene.

If the patient has traveled a long distance in a sleeper just before entering the hospital, the preliminary week of rest usually suffices for recovery from a slight coryza that may be present; and, what is of far greater importance, it gives time for the development of any more serious infection of the breathing passages which the patient may have contracted on her journey, and which might cause a serious or fatal post-operative complication if ether is given within twenty-four hours of her arrival.

We can truthfully assure our patients, then, that the preliminary week in bed before operation is entirely in their interest, insuring a more accurate diagnosis, and a far more comfortable and safe convalescence which may also be shortened somewhat because of the better pre-operative preparation.

Of course the routine week does not always give sufficient time for a comprehensive diagnostic survey of the patient, or for adequate pre-operative preparation in many of our obviously gynecological cases. We need much longer for the best preparation in many of our cases with bleeding and anemia, in many of the pelvic inflammatory diseases, and in some of the cases with ascites. Nor should it be forgotten that, incidentally, some patients in each of these categories escape surgery after a period of study and conservative treatment, which has been undertaken at first as merely preparatory to operation.

Is it asking too much, then, in the interest of conservative gynecology to urge that, in contemplating operation on the individual patient, we habitually adopt a more deliberate method?

A second important factor productive of useless and ill-advised operations, and one closely related to the undue haste which we have just discussed, is the failure to arrive at a correct interpretation of the patient's symptoms. We know that a backache or a certain type of discomfort in the pelvis is often due to a relaxed vaginal outlet and malposition of the internal genitalia. The patient complains of these symptoms, the pelvis presents the malformations expected that might be the cause of the symptoms; ergo, we operate, and too often without relieving the discomfort.

Such errors are made not because of ignorance. We have been taught in the medical school and by daily experience that a given symptom-complex may arise from any one of, or from a combination of, several different physical defects. At the present day we have the means at hand, or competent colleagues who are ready to render assistance, for making such a thorough survey of the patient as to enable us to decide in most instances on the lesion or group of malformations concerned in the patient's ill health and on the proper sequence of treatment. Neglect of such precautions in the interest of the patient can be attributed only to haste and carelessness, factors often more blameworthy than ignorance.

Having recently been asked to write a brief chapter on "Right Lower Quadrant Pain" for Dean Lewis' "Practice of Surgery", I was amazed, on making a brief survey of the literature, at the record of our incompetence in dealing with such a common problem as that of chronic appendicitis. I am certain that any of you who have not kept consistent follow-up

records of your surgical work would be inclined to take umbrage if, off-hand, I accused you of being in error in from 25 to 40 per cent of your operations for chronic appendicitis. I might be in error in making such an accusation, but, if so, it is because you are doing better work than is being done in many of our best clinics.

I cannot do better in this discussion of the factors that lead us into ill-advised surgery than to quote from the conclusions arrived at in that study of right lower quadrant pain:

"It is futile in the present stage of our knowledge to attempt a correct analysis of the relative frequency of the lesions which have been mistaken for chronic appendicitis. One would naturally be biased in such an attempt by viewing the situation from the field in which he is most interested, and since we are urging the scientific view, it is wiser that, in approaching the individual patient, the diagnostician should bear in mind all of the major possibilities. In the order of the foregoing discussion these are: (1) The other lesions of the digestive tract in the ileo-cecal region; (2) orthopedic lesions, including the neurological lesions so ably discussed recently by Carnett; (3) gynecological lesions; (4) urological lesions, particularly stricture and stone in the ureter. Chronic appendicitis and lesions in each of these four domains are of such frequent incidence that the phenomenon of pain in the right lower quadrant may be due to appendicitis alone, to a single lesion in any of the other groups, to a combination of appendicitis and any of these other lesions, or to any combination entirely independent of appendicitis.

"It is the problem of the diagnostician to determine whether the symptoms are attributable to one or a combination of lesions, to advise the patient as to their relative importance, and the logical order of the therapeusis necessary for a restoration to health."

It is unfortunate that the system of end-result studies so ably advocated by Codman of Boston has found a firm foothold in few of our hospitals.

The hospital which is blessed with a social service department should insist that each division having use of the social service be required to keep follow-up records of all its patients. This system, to be successfully carried out, needs a spirit of investigation and cooperation in the head of the department, who will see to it that the younger members of the staff keep careful records of the patients brought in by the social service, and that these records are periodically reviewed by the entire staff for criticism and suggestions.

I know of nothing more conducive to modesty and more destructive to bombastic conceit in the surgeon than to be brought face to face with the actual end-results of his work.

After a patient has been "knocked down" with ether and then "stepped upon" with an abdominal operation, the contrast in her feelings immediately after the operation and after three weeks of rest in bed and good nursing is such that she usually feels like saying that she is "much improved" or even "cured" on the day of dismissal. But, if you would know how much or how little the operation has accomplished, keep in touch with this same patient for a period of one, two, or five years. By such a system the surgeon is made cautious and conservative in his diagnostic and operative work, and the younger members of the staff leave the hospital with far less of that spirit that enables fools to enter where angels fear to tread.

One who would avoid pitfalls in arriving at a correct diagnosis in gynecology must keep in mind, particularly, four others of the major domains of medicine, dealing with diseases the symptoms of which may be misinterpreted as of gynecologic origin. These, as before mentioned, are the neurologic, gastro-intestinal, orthopedic, and urologic domains. Of these four the gynecologist will make most use of his knowledge of urology. The close relationship embryologically and anatomically between the genital and the urinary tract not infrequently results in simultaneous diseases of both, and too often the signs and symptoms of disease in the one tract are misinterpreted as belonging to the other.

Either the gynecologist must be well trained in urology or he must have a trained urologist closely associated with him in his work. The urologist who would do justice to his female patients must likewise be well trained in gynecology or have frequent recourse to the opinion of a well trained gynecologist. Thirty years in gynecology, the latter half of that period having been increasingly devoted to urology in women, has given me a viewpoint which I trust may be of some service to all of those interested in the diagnosis of abdominal and pelvic conditions, and particularly to those interested in conservative gynecology.

Most of you are familiar with the fact that gynecologists frequently operate for the relief of symptoms referred to the urinary tract thinking that these are due to the pressure or drag of tumors, to pelvic inflammatory processes, or to malposition of the pelvic organs. Probably few of you realize how seldom such operations are successful in relieving the urinary tract symptoms. In other words, symptoms referable to the urinary tract practically always indicate disease of that tract, and call for a most careful investigation before making promises to the pa-

tient that relief will follow a gynecologic operation.

If time permitted, I could draw a picture savoring of tragedy, not in one but in many cases, of patients who have spent the better part of their lives in hospitals, undergoing rest cures and multiple operations, resulting in the loss of all their pelvic and some of their abdominal organs, in their persistent efforts to rid themselves of symptoms chiefly referable to the urinary tract. Most of this sacrifice of time, of an active productive life, of money, of anatomical organs necessary for adequate health, and most of the physical and mental anguish, could have been prevented had common sense methods of diagnosis led to the early discovery of the urologic lesion which gave rise to the patient's symptoms.

Each of us has had his share in these tragedies, regardless of how conscientious and painstaking our work may have seemed. Our extenuating alibi has been ignorance; we were elsewhere, mentally, when the crime was committed. We were ignorant of the comparative frequency of elusive ulcer of the bladder and of the difficulties often attendant on locating one of these minute abrasions on an otherwise normal-appearing mucosa. We were ignorant of the still greater incidence of ureteral stricture which, compared with elusive ulcer of the bladder, occurs perhaps in the ratio of 20 to 1. We were ignorant also of the fact that serious lesions may exist in the urinary tract while the urinalysis, formerly our greatest diagnostic dependence in these diseases, may remain perfectly normal. This last fact does not apply exclusively to the gynecologist or the urologist, but is of great moment to every diagnostician. In spite of the agonies suffered by many of the victims of elusive ulcer, the urine is characteristically crystal clear macroscopically and microscopically reveals, on careful search of a catheterized centrifuged specimen, only an occasional red blood cell and leucocyte. The urinalysis in the patient suffering with symptoms due to ureteral stricture may be even more misleading, for in about 30 per cent of the cases it is absolutely normal, in about 50 per cent of the cases it shows slight deviation from the normal in the content of erythrocytes, leucocytes, albumin, casts, or a combination of these. Often these foreign elements are present in such slight degree that the urinalysis is reported as normal or "so slightly altered as to be of no significance." In only about 20 per cent of the stricture cases is there a secondary pyelitis with the characteristic urinary picture.

In cases of ureteral stricture one or both kidneys may be badly damaged by a large hydronephrosis, and yet the urinalysis may be quite normal. In another type the kidney pelves may be smaller than normal, the chronic stasis apparently having induced a chronic interstitial nephritis, and still the urine may remain normal. In this category I have seen a considerable number of patients with kidneys so badly damaged that a pregnancy could not proceed to term.

With our past ignorance of such vital facts concerning the urinalysis it is not surprising that many patients have consulted the diagnostician complaining of symptoms definitely pointing to the urinary tract as the seat of origin, and have eventually found their way to rest cures or to operations by the general surgeon, the gynecologist, or the orthopedist.

The internist may feel that in spite of a normal or approximately normal urinalysis, the symptoms point most strongly to abnormality of the urinary tract, and he then sends the patient to the urologist. The urologist may overlook the tiny lesion so often characteristic of elusive ulcer, or he may suspect a lesion of the upper tract and catheterize the kidneys. But remember that a ureteral catheter without bulb goes through fully two-thirds of all strictures without appreciable obstruction. A flat x-ray in stricture cases usually reveals nothing of value in diagnosis. The urogram may show only those slight changes in the upper tract that the roentgenologist and urologist have both learned to overlook and consider as normal.

In spite of all these conscientious and painstaking efforts at a diagnosis the urinary tract is now given a clean bill of health and the patient is started on his or her downward path of rest cures and operations.

Do you wonder that with such experiences, repeated many hundred times, I have continued for the past fifteen years to make a nuisance of myself in our American Urological Association; or that, when recently invited to address a gynecological group, I was gently asked to present a paper "not relating to a urological subject"?

In a paper recently presented before a Brooklyn Gynecological Society, entitled "What the Gynecologist Should Know About Urology" (*Amer. Jour. Obst. and Gyn.*, 15:453, 1928), and based upon a considerable experience in both these branches of medicine, I attempted to demonstrate that no one can do conservative gynecology unless he has an intimate knowledge of

urology. Time does not permit a detailed review of the diagnostic methods presented in that paper, but allow me to remind you again that many of our worst cases of dysmenorrhoea originate in the ureteral rather than in the genital tract.

Probably more cases of internal dyspareunia are due to tender ureters than to disease of the internal genitalia.

Ovarian neuralgia is far too common a diagnosis which has been responsible for the sacrifice of literally thousands of normal ovaries. If one simply bears in mind the frequent incidence of ureteritis there is usually no difficulty in differentiating oophoritis and ureteritis.

Symptoms referred to as "falling of the womb" (descensus uteri), which are among the most common of gynecological complaints, are often associated with little or no displacement of the pelvic organs, and can be demonstrated by examination, and still better by the results of treatment, to be due to jarring and tugging on the diseased ureters where they pass through the broad ligament.

Menorrhagia.—We occasionally see a patient complaining of menorrhagia in whom the most careful examination of the genital tract fails to reveal a cause for the excessive bleeding. Such patients often present a definite dyscrasia, the cause being found in their methods of living, or in some serious local or constitutional disease. Ureteral stricture, with its damage to the renal function by obstruction, and the consequent toxemia affecting the mental, nervous, gastrointestinal, and other functions, is one of the most fertile causes of a dyscrasia, and not a few cases of menorrhagia have been relieved by the restoration of the general health through the establishment of adequate renal drainage.

It would certainly seem that ureteral stricture often arises as a secondary result of a focal infection, tonsillitis probably being the most frequent cause in young people, and the diagnostician must not forget that a persistent menorrhagia in a young woman may be due to tonsillitis acting either directly on the pelvic tissues or as the cause of general dyscrasia.

The presence of uterine or ovarian tumors associated with high lumbar backache, and pain in the broad ligament regions, especially if accompanied by bladder symptoms, should warn the gynecologist that before operating for the pelvic tumor he should carefully survey the urinary tract, for the real basis of the patient's chief complaints may be found in a serious renal stasis; and attention to this feature before operation improves the patient's general resistance, makes her far less likely to develop a post-operative pyelitis, and incidentally the surgeon "saves his face" in being relieved of the awkward situation of trying to explain to the patient why the operation did not cure the symptoms.

Repair of the sphincter urethrae for incontinence, one of our most useful gynecological operations, often proves a total failure because the incontinence in such cases is due not to failure of the urethral function but to impulses referred from diseased ureters.

Strictly speaking, a discussion of kidney surgery does not belong in a paper on conservative gynecology, but many gynecologists include surgery of the female urinary tract in their work, and you may have already discovered that this paper is concerned with conservative surgery in general. While my work of the past fifteen years has swung increasingly toward the urological field, and the clinical material in this line has vastly increased, yet I am doing fewer kidney operations now than I did during the first half of my gynecological experience.

In that era I was following the traditional practice and operating upon many of the so-called surgical diseases of the kidney. Since discovering that the greatest etiological factor in these diseases is ureteral stricture and interference with adequate renal drainage, I have been forced into more conservative and more effectual methods of work.

I have seen in our clinic four fixations of the kidney in one day. Now our interne, and resident in gynecology, counts it good fortune if in his four years of service he sees one nephropexy annually. Formerly we operated upon many cases with large hydronephroses, either sterile or infected, doing plastic work on the pelvis and supplementing it with a fixation or sacrificing the kidney by nephrectomy. At the present day such operations are rare. Since learning about the adequacy of ureteral drainage through dilatation of stricture areas we have had the satisfaction of relieving by the simpler methods of treatment many of our former patients, who had failed to improve after a nephropexy.

Many patients suffering with pyonephrosis, who formerly would have been considered as inevitable candidates for surgery, are now given

satisfactory drainage by cystoscopic methods, and the affected kidney often shows a remarkable restoration in its working capacity.

The kidney of the so-called essential hematuria, formerly operated upon by decapsulation, splitting, or nephrectomy, is now seldom subjected to operation, and we are getting far better results by simple ureteral drainage than we ever obtained from direct attack on the kidney. These kidneys with their tendency to interstitial changes often show filling defects in the urogram, making it difficult at times to exclude the presence of tumor, and if the bleeding does not cease promptly after the restoration of good ureteral drainage, we are sometimes forced to a diagnostic exploration.

Our surgery of renal and ureteral calculus has been revolutionized through our knowledge of the role of ureteral stricture in these conditions. Many patients of advanced age, particularly if stout, and if the renal calculi are bilateral, have a much better promise of prolonged life and comparative comfort if the stones are ignored and our efforts are directed to the restoration of good drainage.

Formerly, we usually had one or more patients on the ward with prolonged and stinking drainage from post-operative renal or ureteral fistulae; now we seldom see such catastrophes because of the establishment of good ureteral drainage before or during the operation.

Since we have learned that the patient with congenital malformations of the upper urinary tract comes, not because of the malformation, but because of the secondary effects of ureteral obstruction, our major surgery in this class of cases has been greatly reduced.

Quite recently we have been getting some remarkable results from ureteral drainage in tuberculosis of the kidney. At our gynecological section in Asheville last year I presented some of the data on this work.

Surrounded by an associate staff of some of the young aspirants to our surgical profession, picked young men who are keen to see and do all the major surgery possible, I submit that anyone merely riding a hobby, and that "without bit or bridle," would soon reach an inglorious barrier. The fact that each year sees my staff increasingly loyal and enthusiastic in their support of this conservative work which robs them of the more spectacular surgery and throws on them much of painstaking drudgery, must mean that they are interested in the welfare of their patients and that together we are getting results.

Obstetrics and Conservatism.—Obstetricians have just cause for pride in their conquests and advances since, in the days of Holmes, Semmelweiss, and Lister, rather more than a half century ago, we were first taught the nature and mechanism of puerperal infection. And yet one making a plea for greater conservatism in pelvic surgery turns to this field for his best demonstration of the fact that in medicine, as in the machine world, our gains in scientific knowledge have far outstripped our performance in alleviating human suffering. This throws upon us the responsibility of devoting more of our time and energy to an humble investigation of the facts, and to an aggressive cooperative effort to readjust our shortcomings as a profession. I need not present the word of a gynecologist, who has been called many times to patch up the wretched results of ill-timed, meddlesome and incompetent obstetrics, but refer you to the testimony of our leading obstetricians, the best authority concerning the work being done in their domain.

Asepsis, anesthesia, version, forceps, the cesarean operation, when properly used are all methods of untold blessing to the lying-in woman. However, as too frequently happens in medicine, the new weapon gives the man with poor judgment a false sense of his increased powers and a potential blessing is converted to a curse. No less an authority than Benjamin P. Watson, Director of the Sloane Hospital for Women in New York City, at our last meeting of the American Gynecological Society presented the startling thesis that the death rate in childbirth has not been reduced in the past half century. A cursory review of the recent obstetrical literature will reveal to you that this opinion is held by all our leading obstetricians.

Again we see the malign influence of our despicable triplets, carelessness, haste, and ignorance. Statistics show that of the maternal deaths 25 per cent are due to toxemia, an avoidable condition in most cases with proper prenatal care. It seems almost unbelievable that in this day of aseptic surgery 40 per cent of the maternal deaths should still be due to septicemia, but of course most of these occur outside the hospital, our best maternity hospitals now having a death rate from septicemia of less than 0.1 per cent.

The remaining 35 per cent of maternal deaths

are due to hemorrhage and the various accidents associated with pregnancy and labor. Such obstetrical accidents occur in the best of hands, but according to our obstetrical authorities, far too large a percentage of them result from the early use of forceps in normal cases where instruments are contraindicated; and many of them are due to the indiscriminate resort to cesarean section by abdominal surgeons and by obstetricians lacking in proper training or in a sensitive conscience.

This undue haste to shorten nature's more deliberate methods of labor results not only in a large share of the maternal deaths due to accident, and in a generous percentage of those from septicemia, but it is also responsible for much of the morbidity and invalidism which follow labor in the form of pelvic inflammations, bad lacerations of the cervix and perineum, vesical and rectal fistulae, and malpositions of the internal genitalia.

While preparing this paper I was asked to see a patient in the ward, whose case seems to illustrate the timeliness of such a discussion. I recognize the danger and unfairness of criticising the work of a brother physician when one lacks all possible data bearing on the individual case, but I believe you will all agree with me that in this particular case the remaining unsolved problem, of some academic interest, is the motive of the physician in applying forceps.

Mrs. C., aged 39 years, a large, well proportioned woman, was the mother of six healthy children, all delivered spontaneously at term. With her seventh pregnancy she ceased menstruating in January, 1928. On September 20, she was having abdominal discomfort and called a physician, who had not attended her in previous labors. The history relates that he administered a pill early in the afternoon and returned that evening. The patient was still having abdominal discomfort which seemed to her not like labor pains, but in spite of her remonstrances that labor was not due until about October 10, the physician prevailed upon her to take ether for an immediate forceps delivery.

In the intervening twelve months before I saw her she had been in the hospital most of the time and had taken an anesthetic twelve times for a like number of attempts to close a vesico-urethro-vaginal fistula. I demurred at operating so soon after these operations, the last one having been done only eight weeks previously. However, the people were very poor, and had come from a distant Southern state, and examination showed the tissues to be in a more pliable condition than one would anticipate after so many recent operations. After free denudation of the fistula tract I was able to close the wound in three layers, the mucosa of the inner urethra and bladder being closed with a running lock-stitch suture of 40 day No. 00 catgut. The second layer, taken with interrupted fine black silk sutures, caught up the periurethral and perivesical tissues, presumably approximating the torn ends of the sphincter urethrae. The third layer also of interrupted silk sutures, approximated the edges of the vaginal mucosa.

The operation notes stated that while we had fair promise of a successful closure of the fistula, it was questionable whether enough of the sphincter urethrae muscle remained to give the patient the functional result of continence.

To take all strain off the fistulous area, and in particular to place the sphincter muscle at rest, I made a small vesicovaginal fistula just anterior to the cervix, and introduced a mushroom catheter for temporary drainage and for daily bladder irrigations with 1:5000 silver nitrate solution.

On the fourteenth day it was found that the original fistula was closed. The external black silk stitches were removed, the edges of the accessory fistula were infiltrated with novocain solution, the mushroom catheter was withdrawn, the fresh epithelium lining the fistula was excised, and the edges of the tract were approximated with four sutures of fine virgin silver wire. All this was done under local anesthesia with the patient in the knee-breast posture. She was now returned to the dorsal position and asked to void. This she could not accomplish. A female glass catheter met definite resistance on passing the sphincter region; and it withdrew about 150 c. c. of urine and a large quantity of air which had entered the bladder through the accessory fistula while the patient was in the knee-chest posture.

To safeguard both of the recently closed fistulae, and to give more time for the recovery of sphincter function, a No. 10 male urethral catheter was introduced through the urethra for drainage and irrigations. This urethral catheter was removed at the end of three days and the patient was allowed to get up and move about the ward. She was instructed to void at least every hour in the day, and the nurses were to awaken her every two hours at night. At the end of ten days, before removing her silver-wire sutures, we secured a cystogram with the bladder holding 140 c. c. of sodium iodide solution, which caused a feeling of fullness in the bladder (see *Fig. 1, page 730*). The patient stated that she could control the urine for some time after the onset of this feeling of a full bladder, but we instructed her not to test her retention power for at least two weeks after the removal of the stitches.

She left for home happy over the recovery of the bladder function, but still complaining of dragging backache and a feeling that the pelvic organs were prolapsing. These symptoms were apparently due to the badly lacerated cervix and outlet, with retroversion and descensus of the uterus. In this case we did all the conservative surgery indicated at that time; but I fear that the patient still faces her fifteenth operation to correct permanently conditions that were caused by an ill-advised use of forceps 20 days before labor was due.

Need I emphasize again that version, forceps, or the cesarean operation, when indicated and when used under proper precautions in competent hands, may prove of great beneficence, but when abused by faddists, even in the best of hos-

pitals or used by the skilled or unskilled in hospital or home to enable the operator to hasten nature's more deliberate methods and insure his arrival home for a warm breakfast, they are too often followed by death or serious morbidity.

In the original outline of this paper I planned to present in considerable detail some of the conservative methods of office treatment one learns to use in gynecological practice in preference to the more radical operative measures one is likely to depend upon while getting his training in a large hospital clinic.

I hoped to discuss the office treatment of various conditions of the cervix. I also planned to discuss in some detail the important position which radium holds in gynecologic practice. Again we are confronted with delicate problems of a social and economic nature. Many men are doing good operative gynecology, who can not afford the large investment for an adequate quantity of radium, and many who could afford this investment have not the time or patience for such study of this therapeutic agent as would enable them to use it with discrimination and intelligence. Shall we proceed with our traditional methods and operate upon all cancers and fibroids of the uterus, thereby enhancing our own prestige and bank account, or shall we consider the patient's welfare and deliberately turn over many of these cases to a select few of our profession, who are willing to make the sacrifices necessary for the intelligent use of this potent weapon?

In particular, I had hoped to enter into some detail concerning the usefulness of the pessary in furthering conservative methods in gynecologic practice.

However, one must not trespass too far on gracious patience, and I fear that your endurance has already been taxed by the above more general considerations on surgical policy, special care in diagnosis, and conscientious inventory of the final results in all our methods of treatment, be they surgical or more conservative. If what has been said has stimulated even a small portion of you, my fellow workers, to a more deliberate and thoughtful attitude in your daily rounds, I shall feel that our half hour together has been well invested. As surgeons we have won the respect and confidence of our fellowmen, and our contacts give rise to many intricate problems, physical, moral, social, and economic. In making decisions, we cannot do better than to fall back on the old-fashioned Golden Rule as our touchstone.

A CASE OF PRIMARY TUBERCULOSIS OF THE TONGUE NOW CURED*

By ELIZABETH BASS, M.D.,
New Orleans, La.

In 1926 I[1] reported two cases of tuberculosis of the tongue which appeared to be primary. One of the cases was under treatment at the time for a small ulcer that had not entirely healed.

I wish to present the follow-up of this case, because,

(1) Primary tuberculosis of the tongue is rare;

(2) The patient has been under observation for almost seven years;

(3) From all indications he is well;

(4) The infection still appears to have been primary in the tongue;

(5) The patient is a physician whose observations and study of the symptoms and progress of the disease in his case should be of value.

The following notes are from my previous report:

The patient is a male, aged forty-three years. The family history is negative for tuberculosis. He had pneumonia at the age of seventeen years, and a severe attack of influenza in 1918. He smokes a pipe and cigars, but there is no history of injury to the tongue and there are no carious teeth adjacent to the lesion.

In February, 1923, the patient noticed a small mass on the dorsum of the tongue in the midline about 1 inch from the tip. A brother practitioner thought it was a cyst, which he incised, and found that it contained blood only. The incised wound healed completely.

In April, 1923, he consulted Dr. Frederick W. Parham, who, fearing the growth might be malignant, attempted to excise it. Dr. Parham described the lesion as "a small globular mass about the size of a filbert, situated in the substance of the tongue in the midline about ½ inch from the tip. This seemed to be a distinctly circumscribed tumor, and an attempt to excise it was made, but the tumor broke down and apparently was not completely removed."

The excised piece of tissue was referred to me for microscopic examination. The sections showed typical tuberculous structure. There were numerous tubercles and many giant cells, as well as caseation and round-cell infiltration. The sections were seen by Dr. John A. Lanford, who concurred in the diagnosis of tuberculosis.

The incised wound healed in about two weeks. The patient went to Dr. Joseph C. Bloodgood three weeks later, because of the marked induration which occurred and the slight pain which developed at the site of the lesion. Dr. Bloodgood confirmed the diagnosis of tuberculosis, both on the sections sent him and on tissue

*Read in Section on Pathology, Southern Medical Association, Twenty-Third Annual Meeting, Miami, Florida, November 19-22, 1929.

which he excised. Following x-ray examinations of the chest, Dr. M. Kahn diagnosed an old fibrous tuberculosis, which he considered in all probability healed. After a comparative study of the roentgenograms made sixteen months later, however, he thought the pulmonary infiltration and thickening might be due to an old non-tuberculous inflammatory process.

The patient stated that following the excision of the second piece of tissue ulceration occurred, which extended until practically the entire dorsal surface of the tongue was radially involved.

At the end of three years the ulceration was healed. This long period of activity confirms Murphy's observation. In discussing one of his cases of tuberculosis of the tongue, of the tuberculoma type, Murphy[2] states: "The process of repair will be slow, because this is the rule when muscle tissue is the seat of the tuberculosis."

The treatment consisted of roentgen ray applications for about every two to three weeks, from June, 1923, to September, 1924, when radium was substituted. Radium was applied about every ten days until March, 1925, when the ultraviolet ray was added to the radium treatment.

The subsequent history is as follows:

After the lesion in the tongue healed, the patient experienced no further discomfort for several months. Following this, he states that an "irritation" appeared in his throat. This was accompanied by little or no pain, no cough and no hoarseness. The symptom continued, and later, pain developed, but still there was neither cough nor hoarseness.

In November, 1927, he consulted Drs. John B. Elliott and Robert C. Lynch because of the above mentioned laryngeal disturbance. Dr. Elliott could find no evidence of pulmonary tuberculosis. Lesions were found in the larynx which were interpreted by Dr. Lynch as tuberculous. A change of climate was advised and the patient was referred to Dr. Frank L. Dennis, of Colorado Springs. Dr. Dennis states that he found a rather extensive lesion of the larynx, which involved the epiglottis, aryepiglottic folds, and the arytenoids. There was no tongue lesion and the cervical lymph nodes were not enlarged. The patient was examined by Dr. Gerald B. Webb, who could find no definite evidence of pulmonary disease, either by physical signs or x-ray. He found only a trace of possible calcification of tiny spots at the root of the left lung, which gave no physical signs.

In a report of this case, in 1928, Dr. Dennis[3] states: "Insofar as clinical evidence goes, it is a case of laryngeal tuberculosis without lung involvement. If there be a lung tuberculosis all the clinical procedures at our command do not reveal it."

For the last four years Dr. W. J. Henderson has observed the patient from the roentgen standpoint and he states that at no time during this period has he seen anything that would point toward a tuberculous lesion in the chest. He feels that should tuberculosis have existed at any time, in a definitely diagnosable form, some evidence of its presence would still remain.

Under heliotherapy and local applications the patient improved until all symptoms had disappeared by February, 1928. The duration of the condition was about seventeen months.

DISCUSSION

The results in this case emphasize the importance of an early and certain diagnosis of tongue lesions, which can be made only by histological examination of the diseased tissue. The diagnosis of tuberculosis is justifiable when either characteristic tubercles or tubercle bacilli are found. The type of lesion in this case was a tuberculoma, which is easily mistaken for a neoplasm or gumma. At the time of his examination, Bloodgood[4] states: "The interesting point in this case is that, clinically, it had the induration of cancer."

In primary tuberculosis of the tongue most authors believe that trauma, single or repeated, is the one important etiological factor which is responsible for the localization of the tuberculous process. Murphy states: "Almost all infectious granulomata come from a primary lesion in the mucosa or submucosa." In this case the first indication of an abnormality was the presence of a lesion which appeared to be a cyst. This was incised. It is impossible to say whether tubercle bacilli were already present, or whether they gained entrance through the incision. Because of the presence of many giant cells it would seem that the infection preceded the incision into the lesion.

The infection appeared to be primary in the tongue from its earliest recognition, because of the absence of signs and symptoms of tuberculosis elsewhere. In every other respect, the patient seemed to be in perfect health, both prior to the appearance of the lesion and, also, during the time in which local symptoms and signs were manifest. There was at no time an evening rise of temperature, nightsweats, cough nor expectoration. There was no loss of weight. In fact, the patient even gained in weight while under treatment.

The vocal cords did not seem to be affected. In laryngeal tuberculosis, secondary to infection in the lungs, the cords are usually the first to become involved. All sputum examinations for tubercle bacilli were negative. As a rule, the sputum of patients suffering from secondary tuberculous processes in both the tongue and larynx contains a large number of tubercle bacilli.

Henry,[5] reporting four cases of secondary tuberculosis of the tongue, states: "Cases will undergo healing, even after considerable ulceration of the tongue, but as a rule the occurrence is a grave prognostic omen." This might be expected when it is realized that the majority of patients with secondary involvement of the tongue are suffering from advanced pulmonary lesions also. Fortunately for this patient, there is no definite evidence of tuberculosis in other

organs and there is every reason to believe he should remain well.

In answer to my request for a statement as to his health at the present time, and as to his management of a case under similar circumstances, the patient writes that he is in the best of health and that he has been hard at work, for over a year, in general practice. He maintains his normal weight and is able to continue his regular duties as a physician. He feels confident that the initial infection was in the tongue. For treatment of a similar case he would advice (a) removal of tissue for diagnosis, (b) absolute rest, (c) a change of climate, and (d) small doses of roentgen ray.

CONCLUSIONS

(1) Because of the absence of pulmonary symptoms and presence of the antecedent extensive ulceration of the tongue, which had been healed for several months, I believe the laryngeal infection, if tuberculous, occurred by direct extension of the pre-existent lesion in the tongue.

(2) Since repeated examinations by competent clinicians over a period of practically seven years still reveal no demonstrable tuberculosis elsewhere, and since there has been no return of the laryngeal symptoms in almost two years, and no recurrence in the tongue for about four years, in my opinion this is unquestionably a case of primary tuberculosis of the tongue which is now cured.

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DISCUSSION (*Abstract*)

Dr. John A. Lanford, New Orleans, La.—I was fortunate enough to see the original sections from this case, and, as Dr. Bass stated in the paper, I am of the opinion that it was tuberculosis. We know the difficulty of making a positive diagnosis of tuberculosis, but from the exclusion of other probable etiological factors we concluded it must be tuberculosis. It is interesting to note the development and final cure of the case. Evidently the lesions reported in the lung by Dr. Kahn were due to a previous pneumonic process or previous influenza and were not characteristic nor diagnostic of tuberculosis. I think we can add this case to the few reports of primary tuberculosis of the tongue, as it was carefully worked out and all sources of error were excluded.

Dr. L. A. Turley, Oklahoma City, Okla.—Dr. Bass is to be commended for the exhaustiveness with which she has ferreted out every possibility in making her point, and for her diligence in following up the case. This paper should remind us that tumefactions in unusual places should not be assumed to be neoplastic, and it should also remind us that tuberculosis may occur in unusual places. In my experience, there was one case of tissue sent to me from a tooth socket, suspected of being sarcoma. The tooth had been removed, the socket did not heal, but tumefaction had occurred. The lesion turned out to be tuberculous. Later examination of this patient revealed clinical and x-ray findings of tuberculosis, so this was probably secondary. We wondered whether the reason for the removal of the tooth was tuberculosis, or whether the tuberculous focus was localized as the result of the trauma to the gum and jaw. Since the disease was present in other parts of the body, I presume the latter conclusion would be drawn, yet we cannot eliminate the possibility of independent infection from contaminated food, which I presume is the explanation of the infection which Dr. Bass would assign in her case.

Dr. Homer Dupuy, New Orleans, La.—Dr. Wallace Durel, our great authority on tuberculosis in the South, has afforded me unusual opportunities to study throat and laryngeal manifestations of this disease in his Charity Hospital service. We are yet to see a primary laryngeal tuberculosis, or such a primary lesion of the tonsils, fauces, or tongue. Dr. Bass, unquestionably, has proven that her patient had primary tuberculosis of the tongue. In such a lesion it seems easy to believe that the constant trickling of infected secretions from the tongue could invade the larynx. And yet by contiguity of tissue it is surprising that the epiglottis should have escaped infection. Dr. Bass stressed that when the larynx was involved in pulmonary tuberculosis, the vocal cords were usually affected. We distinguish two clinical types of laryngeal tuberculosis: the intrinsic, and the extrinsic. In the former only the interior structures of the larynx are affected. There is dysphonia, but no dysphagia. In the extrinsic, in which the arytenoids and epiglottis may be involved, there is marked dysphagia, and little or no dysphonia. It is important to distinguish these two types. In our work, Dr. Durel has always insisted that even in suspected primary throat manifestations, should the scrapings show acid-fast bacilli, only by culture, inoculation of guinea pigs, and infection, could we prove a primary involvement of the larynx or contiguous parts. Dr. Bass has scientifically proven her case by other means.

Dr. Bass (closing).—Dr. Turley's case, I believe, was probably a secondary infection.

I think Dr. Dupuy did not hear that part of the paper in which I stated that not only the epiglottis but the aryepiglottic folds and the arytenoids were involved, apparently by contiguity.

There is at present a case of secondary tuberculosis of the tongue in the Charity Hospital. The patient has advanced pulmonary tuberculosis from which he is not apt to survive more than two or three months. In the records of this large hospital there are only two other cases of tuberculosis of the tongue, both second-

ary. One case was treated in the hospital in 1914, the other was discovered at autopsy.

I did not stain sections of the tissue for acid fast bacilli. The diagnosis was made on the presence of typical tubercles and other tissue changes characteristic of tuberculous structure.

THE GENERAL SURGEON AS A RECTAL SPECIALIST*

By ADDISON G. BRENIZER, M.D.,
Charlotte, N. C.

The injection method of treating hemorrhoids has led physicians all over the country into the field of the rectal specialist. Patients are attracted to them largely through the lure of getting treatment without the knife and without hospitalization.

In 1903, when I was a medical student, gynecology, largely under the influence of Howard A. Kelly, was becoming a surgical specialty. Since this time, and more and more in recent years, laryngology, urology, neuro-surgery, thoracic surgery, and proctology have become specialties, embracing in large part surgical methods of treatment. We heard for a while of medical and surgical gynecology and medical and surgical urology, these and other specialties always becoming less medical and more surgical.

There is no short route to the practice of surgery of any part of the body, whether embraced as a whole or sectioned off to suit the various specialists, since surgery demands a background of anatomy, pathology, diagnostic and technical skill and, above all, judgment as to when and where to apply surgical treatment.

As Heuer says ("The Training and Qualifications of the Surgeon", SOUTHERN MEDICAL JOURNAL, January, 1930):

"Surgery and medicine today are different only in their therapeutic methods. Both employ the same methods of history taking, physical examination, the same laboratory aids and instrumentaria in diagnosis. But the moment the diagnosis is made and therapeutic measures are indicated, their paths diverge . . . The possibilities of harm to the patient, if this is misdirected or badly performed, are so great that its execution should not be left to haphazard methods . . . There seems to be no unanimity of opinion of what the training of a surgeon should be; yet when one reads the words of those who have written upon the subject, it appears that all have pretty much the same idea as to what the product of the training should be. He should be a man who has a thorough knowledge of surgical pathology, and of the fundamental principles of surgery; a wide experience in the diagnosis of surgical diseases and their operative treatment; a knowledge of pre- and post-operative care of patients; skill and meticulousness in his operative technic and good surgical judgment."

Most surgical specialists do not comprehend this background, but depend in large part upon a proficiency in technical skill, developed through oft repeated operations on the same parts; oft repeated, with an orthodoxy equal to that of a religious sect, but with a misconception entirely unworthy of a proper consideration of the fundamentals of surgical training.

One recalls the definition of the specialist: "He is a man who knows more and more about less and less."

Too often, the word specialist goes out, with a bid for cases along a certain line of work, without any adequate training. It makes its appeal only through the charm of proficiency connoted by the word specialization.

And strange, indeed, is the attitude of the well trained general surgeon, that the more he descends anatomically, from scalp to anus, the more unworthy are these parts of his conscientious consideration. Rectal patients are often actually neglected by the general surgeon in his eagerness to apply his skill to higher anatomical parts. One of the best papers I ever heard, and with a remedy that actually gave relief, was delivered before the Southern Surgical Association on "Pruritis Ani," but was given with a sort of an apology and there was an uproar of laughter throughout the ridiculous citations of the plight of these patients.

Pruritis Ani and Vulvae.—I know of nothing equal to the injection under the skin of 1-3000 hydrochloric acid for the relief of pruritis ani and vulvae.

Granville S. Hanes describes the method as follows: A needle, No. 19 or 20 gauge, about 3 inches long, is introduced through the skin in the posterior median line one inch from the anal margin. As soon as the needle is passed well through the skin it is directed to the right of the anal margin well under the cutaneous surface. As it is advanced under the anal margin structures, the fluid is so gently forced through the needle, and it so completely separates the loose tissues, that its forward motion is often not recognized by the patient. From 20 to 30 c. c. of novocaine, 0.5 per cent is distributed in the tissues on the right side. The needle remains *in situ* until the injection is completed. If a 10 c. c. syringe is used 10 c. c. of the fluid is injected each time. After the novocaine is injected, while the needle remains in position, 15 to 20 c. c. of 1-3000 hydrochloric acid is injected in the tissues which have just been anesthetized. After the right side has been completely injected, the needle is withdrawn to the point of introduction and the left side is treated in a similar manner.

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If the perineal skin or the vulva are involved the needle may be introduced in the median line at the anterior anal margin and the injections given in a manner similar to that around the anus.

Fissure in Ano.—The same general principles are applicable to fissure in ano as to an indolent ulcer anywhere, that is, refreshment of the superficial granulations and increase of arterial blood supply to the thickened and closely meshed scar tissue of the base. This can be accomplished by full dilatation of the sphincter and cauterization of the fissure. The sphincter should not be cut, for sphincters cut at any site except in the midline at the posterior raphe will gape, will leave a scar filling in that segment of the sphincteric ring and frequently there will be a lack of closure at the location and leak along the cicatricial groove so formed.

Fistula in Ano.—Should the sphincter be cut, along with the opening of the fistulous tract in fistula in ano? Why cut these sphincters, when fistulae leading from the skin through the abdominal wall, down between the intestines to the rectum in the depth of Douglas, vesico-vaginal, vagino-rectal and even those that traverse the tissue for long distances upward between vagina and rectum, are not so treated? A congenital case of this kind has just come under our observation. The fistula may be dissected from skin to rectum above the sphincter and there tucked into the rectum with a purse string suture, as one would treat an appendix stump. Healing will then be obtained with little or no drainage and no sphincteric disability. We have a number of such cases to verify this statement. Or the rectal mucosa may be separated from the muscularis, just as one dissects up the vaginal mucosa, the rectal end of the fistula closed in the muscularis and then the fistulous tract may be dissected out from the skin towards the rectum or merely curetted out. The rectal opening is closed behind the mucosa. All such procedures should be preceded by full dilatation of the irritable sphincters to the point of their temporary lameness.

Hemorrhoids.—There is no doubt in my mind whether hemorrhoids should be removed under strictly surgical methods or whether they should be injected with carbolic acid and glycerine preparations or with quinine and urea.

The greatest objection to the injection treatment of hemorrhoids is the failure adequately to dilate the sphincter. This dilatation alone will frequently relieve, if not cure, varicose hemorrhoidal veins and those well suited for the injection treatment. If the varices are clotted and even partly organized, they can be dissected out behind the mucous membrane, the upper end of the vein and artery tied and the edges of the mucous membrane allowed to fall together. Wherein do these varicose veins differ from those elsewhere, except in their terminal bulbs below the grip of the sphincter, which make dissection easier? If the hemorrhoid is organized and fibrous, polypous or ulcerated and bleeding, is it not more readily removed by one of the dissection, ligature or clamp and cautery methods?

The Whitehead operation for hemorrhoids pushed refined surgical principles too far and has given way to simpler but cruder procedures in most cases.

The aftermath of the injection treatment has shown us uncured cases, narrow and spastic ani, ischio-rectal and peri-rectal abscesses.

All patients sent to us with supposed hemorrhoids have not this condition, but have carcinoma of the rectum. Again, the importance of the admonition of one of my old professors: "Never let a patient leave you without looking down his throat and up his rectum."

Imperforate Anus.—The treatment of three cases of imperforate anus has involved, at least, some surgical ingenuity. In one case the anal sphincter was substituted by transferring the lower end of the rectum to a more anterior position, between the edges of the levator ani muscles, crossed from one side to the other. This case was operated upon in April, 1926, and to date has about complete bowel control. The second case demanded an immediate sigmoidostomy, to be followed later by a transfer of the rectum to the perineal position again between the crossed edges of the levator ani muscles. The third case had also a congenital fistula, which led from the vaginal fourchette up between vagina and rectum to open in the pelvic rectum. The proximal end of this fistula will have to be closed through the abdominal route.

Finally, the cases of prolapsus, not to mention the cases calling for resection, have led us far afield from classical operations, as described in the various textbooks and monographs on the subject.

A case on hand at present in a woman 73 years old, twice operated upon and recently treated by a rectal specialist, showed a prolapsus of five inches, with edema and ulceration, wide and atonic sphincteric ring and no bowel control. This patient, after four weeks, has a restoration of the prolapsus, no bowel leak and ability to lift the perineum and actually feebly to grip the finger inserted in the rectum.

The operation done on her embodied the conception of the David-Rehn-Delorme combination with a support forward by the levator ani muscles and behind by the coccygeal fascia. The plan of this operation was suggested by a background of general surgery and gynecology and the specific technic of restoration of a voluntary sphincter ani.

The object of all such operations for prolapsus ani must be more than the support of the extruded bowel and a plastic closure of the lower rectum. It must also be the restoration of a voluntary sphincter ani and an elastic contraction of the lower end of the rectum sufficient to retain liquid feces and gas. This has already been accomplished in four weeks in the above cited case.

Likewise it was a general surgical background which led Wreden and Stone (*Archives of Surgery,* March, 1929) to the conception of restoring a voluntary sphincter ani by the use of strips of fascia, looping and pulling in the anal outlet through the contraction of the gluteus maximus muscles, around whose mesial edges these fascial strips were tied.

210 Professional Building

THE COMBINED METHOD OF INJECTION AND CONTINUOUS PRESSURE IN THE TREATMENT OF LOWER LIMB VARICOSITIES*

By J. N. Baker, B.A., M.D., F.A.C.S.,
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To those who have laboured many years in the surgical vinyard and have watched the evanescent ebb and flow of the tide of fadism sweep many from the safe moorings of the practical out into the vortex of the impractical, the simple and uncomplicated method of accomplishing an end makes more than a passing appeal.

Lower limb varicosities, because of their frequency, because of the many attendant, disagreeable discomforts, such as the nagging and perennial eczema, or because of the more crippling manifestation of ulcus cruris, have rightly been the source of much concern to both surgeon and patient.

The insidiousness of development of varicosities, ofttimes first asserting themselves in early adult life and reaching out over a long period of years, seems to implant in the patient's mind an attitude of stoic indifference and resignment to accept his physical handicap and to limp along through life as best he may. This mental concept, not infrequently, has been strengthened by the unhappy experience of some friend who "suffered a relapse" after a surgical removal of his veins.

The surgical devices resorted to in an effort to cure this defect are many, from the simple ligation of Trendelenburg of the long saphenous to the complete removal of this vein, together with its tributaries. Most surgeons have tested out all of these; yet even the choicest of them, and in the hands of the ablest surgeons, when the final toll is taken, leave much to be desired.

McPheeters, reporting recently on a study of 6,771 cases operated upon by many different surgeons, gives the recurrence percentage in this series as 5 at the end of one year; at the end of five years this percentage had mounted to 19.2; this is morbidity.

In this same series of cases there were 63 deaths from pulmonary embolus and other causes: an operative mortality of 0.94, or almost 1 per cent; the number of hospital days was 15.1; the number of days lost from work 34.8.

Contrast these figures with his assembled data on 53,000 injected cases with but four deaths: a mortality of 0.00754, with no hospitalization and practically no interruption of routine duties.

The surgeon's *bete noire,* the deliberate creation within a vein of a much dreaded thrombus with all of its horrid potentialities of a full-blown embolus, seeking a final resting place within the lungs, seems to have been definitely dissipated by recent pathologic and roentgenologic studies as to the actual happenings when these sclerosing agents are introduced within the lumen of dilated and incompetent veins.

First, let us consider the interesting contribution of Bernheim, of Baltimore, dealing with fatal emboli from thromboses. He states that he has never known of a fatal pulmonary embolus arising from a thrombus of the saphenous veins and that they rarely, if ever, pass over into a femoral vein thrombus; and, further, that in so far as fatal emboli are concerned, these veins, the saphenous and the femoral, are comparatively innocuous. He, therefore, concludes that most of the fatal postoperative emboli arise not from the long veins of the extremity, but from

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thrombi lodged in the short, concealed veins of the pelvis.

Second, on the pathologic side, de Takats and others, from a number of carefully studied specimens taken at various stages in the organization of the thrombus, have shown that there is a pronounced difference, both in the gross and microscopic appearance, between the artificially induced chemical thrombus and the so-called static, intravital thrombus. The latter, or intravital thrombus, lies for the most part loose within the vessel lumen and is quite devoid of stabilizing moorings; whereas the former, or chemically induced thrombus, is shot through with newly formed capillaries entering the thrombus at right angles from the injured intima, thus providing firm anchorage to the vessel wall.

In short, the one, because of inherent differences in structure, is quite prone to become migratory; while the other positively does not show such tendencies. Consequently we see that the immediate effect of these caustic agents, when injected within the vein, is to bring about an aseptic chemical endophlebitis, accompanied by a firmly anchored fibrinous exudate as a result of the destruction of the endothelial lining in whose meshes the blood shows a strong tendency to clot formation and consequent obliteration of the vessel lumen.

According to de Takats, one of two things usually happens: either the injected vein will remain collapsed, the injured surfaces being held together by the exudate; or else, a definite thrombus forms, rapidly organizes and can be palpated as a firm mass within the vein. This thrombus persists for a varying length of time, from two or three weeks to as many months, or even longer, depending largely upon the size of the vein, the severity of the reaction and the amount of perivenitis resulting from this reaction. While one might hesitate to cause too much discomfort for the patient by reason of a too sharp local reaction, yet clinical experience has shown that a tender, somewhat reddened and hardened vein usually presages complete obliteration in that segment.

Third, on the physical and experimental side is to be found much work done by McPheeters, Jentzer, G. Magnus, Sicard, Forrestier and others, using shadow-casting solutions and watching, with the fluoroscope, the behavior of such solutions when injected within these veins.

The most recent of these studies is that of McPheeters (*Surgery, Gynecology and Obstetrics*, 1929). With the limb at absolute rest and in the horizontal position, the injected fluid remained stationary about the point of the needle. Upon the application of very slight exertion, the mere raising of the head, the fluid was seen to separate into globules and to move downward, not upward, within the vein. A little more exertion, the raising of the head and body, and the fluid was seen to break up into numerous particles and to drift placidly down the entire length of the saphenous vein. Decidely more exertion, forcibly pushing the foot against the examiner's hand, and the globules were seen to dash through the communicating veins into the deep veins and thence onward to the general blood stream. None found its way back through the superficial veins.

From these observations, McPheeters concludes that in all lower limb varicosities the circulation within these veins is either stagnant or actually reversed; and that the chemically induced thrombus, even should it become detached, will be forced distally towards smaller veins, where it will certainly become arrested.

While, in the light of this evidence, the surgeon's horror of an embolic disaster may be justly changed, carelessness, either in a thorough study of the individual case or in the minutiae of technic, should never be permitted to creep in. Many patients present themselves for relief, not because of the varicose veins *per se*, but because of the crippling disabilities consequent thereto; and, having already reached or passed the meridian of life, are likely to show degenerative changes in the entire vascular system, such as generalized arteriosclerosis, hypertension and myocardial weakness. De Takats quite properly points out the importance of the early recognition of partial or total arterial occlusion with which varicosities are frequently associated. Cases in which marked edema is present should be carefully tested to insure competency of the deep veins before obliteration of the superficial circulation is attempted.

Patients from whose history one or more definite attacks of acute phlebitis can be elicited, because of the ever-present possibility of lighting up a dormant infection, should either be definitely excluded or else given a long period of probation, measured in years, to justify the use of the injection method.

Sicard reports one such case of phlebitis after injection which came near terminating disastrously because of failure to observe this precaution.

Pregnancy, in an otherwise normal person, is no barrier. Two of the writer's cases have been in pregnant women, who have sought relief because of the nagging discomforts experienced in the latter months of previous pregnancies.

Hypertension cases and chronic nephritics, provided the myocardium and compensation seem good, and provided also the arterial and deep venous system of the extremities are unimpaired, should not be debarred. It is in this class, in which vascular crises are notoriously common, that most of the unpleasant mishaps reported in the literature have occurred; and one can hardly escape a lurking suspicion that some of these might have occurred had no injections been given.

The technic, while not without its tediums, is comparatively simple. A thorough physical examination, including blood pressure, urinalysis, palpation of femoral, popliteal and tibial arteries and the tests for the competency or incompetency of the valves of the long saphenous and of the permeability of the deep veins, should first be made. The patient, barefooted and with both limbs exposed to the hips, is then made to stand on a bench or stool, thereby briging out more prominently all varicosities. In this position the operator determines by observation and careful palpation which veins should first be treated, selecting, as a rule, those most prominent. In case an ulcer be present, as many tributaries as possible leading from this area should be taken in order to facilitate its healing.

The patient should now be placed on the operating table with the head and upper body somewhat elevated and the lower limbs horizontal. The tourniquet, because of the reversed circulation in these veins, is worse than useless. With the limb in the horizontal position, little or no difficulty should be experienced in entering and remaining within the larger or even medium sized veins, and the manipulation of the syringe is certainly much simplified with the patient in the recumbent posture. The vein in this partially collapsed state will receive the solution in a more concentrated form and the object sought, damage to the endothelial lining, is materially enhanced. Some of the smallest radicles, such as those leading into telangiectatic spots, may have to be injected in the standing posture, which, however, considerably increases the perplexities of the procedure. One never injects until, by aspiration, a free flow of blood is seen coming back into the syringe. The injection should be made quite slowly, watching, all the while, for any manifestation of swelling or of pain at the site of puncture. In case of the slightest doubt, one should not inject until aspiration proves that he is safely within the vein lumen.

The solutions used by the writer have been a 20 per cent solution of sodium chloride or a 50 per cent solution of dextrose. The former is distinctly more of a cauterant, produces a decidedly sharper monetary cramping of the limb and, if deposited paravenously, will almost certainly cause necrosis of the soft tissues; whereas with the dextrose solution, such reactions are decidedly less marked and sloughing rarely occurs, even though some of the solution finds its way into the surrounding tissues. The amount of the solution injected at each puncture will vary from 8 to 10 c. c. in the larger branches to 2 or 3 c. c. in the smaller veins.

The comparative innocuousness of both of these solutions, in so far as systemic reaction is concerned, permits of a large amount of either being employed, should an individual case seem to justify it. Four or five different sites may be selected for injection and a total of 30 to 40 c. c. used, without fear of harm to the patient. Von Meisen, of Copenhagen, whose experience has been large, employing a solution consisting of equal parts of 25 per cent sodium salicylate and 10 per cent sodium chloride, never injects more than 10 c. c. as a maximal dose and considers 25 c. c. of this solution as an "infarct-giving" dose.

What of the after-care of these cases?

Many workers in this field are persuaded of the importance of maintaining, for a varying length of time after injection, a firm, even pressure not only over the site of the needle puncture, but over the entire limb. The various devices, such as the woven elastic bandage and the gauze elastic, or "ace," bandage inevitably crumple and give way in spots under muscular exercise, with a resultant unevenness of pressure which thwarts the very purpose for which they are applied.

The writer's earlier injected cases were treated by the immediate application of a gauze elastic, the ace, bandage, having the patient return daily for readjustment. In almost every case, even in the more slender and shapely limb, inequality of pressure, particularly in the lower half, at once became manifest, with more or less discomfort to the patient resulting from

this unevenness of pressure upon the tender sclerosing superficial veins.

The expedient was then adopted, after first instructing the patient in the proper method of applying the bandage, of having him remove the bandage upon retiring and reapply it upon rising. This plan seemed to work better from the standpoint of the patient's comfort, but produced a break in the continuity of pressure upon the veins.

A small series of cases were next handled by dispensing with any effort to make pressure to the entire limb, merely using for 48 hours a small gauze pad over the site of puncture. These cases seemed to do quite as well, if not better, than those in which gauze compression bandages had been employed.

About this time, a case presented itself with many varicosities complicated by an indolent ulcer of long standing. For many years past and before the injection method had come into vogue, it had been the writer's custom to treat these ulcer cases by means of the Unna paste boot and with quite gratifying results in so far as the healing of the ulcer was concerned. No other agency can compare with this boot, when carefully applied, in furnishing that smooth, continuous, unbroken pressure so essential to the comfort and healing of these cases.

The idea occurred that in this case it might be well to inject as many veins as seemed expedient (five points were selected) and immediately to apply the Unna paste boot. This was done and the patient was requested to report the next day. Upon his return, the leg was entirely comfortable, with no tenderness at any of the injected sites, so a small window was cut over the ulcer area and the patient instructed how to care properly for this. At the end of two weeks the ulcer had healed; at the end of four weeks the boot was removed and two remaining varicosities were injected and a second boot applied. This was worn for three weeks and upon its removal the leg appeared in practically a normal condition and the patient was discharged.

The happy outcome in this case lent encouragement to a trial of this method of applying continuous pressure in other of the more pronounced cases of varices uncomplicated by ulcer.

If clinicians are correct in the assumption that compression constitutes an important part of the after-treatment of these cases, then it seems logical to conclude that the more ideal and perfect this compression, the more satisfactory will be the outcome. Common sense dictates that the application of the proper amount of pressure continuously to the injected vein should speed up the agglutination of its injured surfaces and minimize the tendency both to extensive thrombus formation and subsequent canalization of its lumen.

As stated above, the various types of elastic bandages now in common use leave much to be desired in this regard and it was in an effort to overcome these defects that the Unna paste boot was hit upon as a substitute.

To date, the opportunity has presented itself of making use of this method of continuous pressure in but ten other cases, a number too small from which to draw lasting conclusions. None the less, a rather fixed impression has been gained that this boot, when smoothly and properly applied, hastens the obliteration of the vein lumen, lessens the degree of perivenitis and, by splinting the superficial veins and forcing the blood through the deep system, definitely facilitates and shortens the entire healing process.

In conclusion, these things may be said:

(1) Pathologic and roentgenologic studies of artificially induced thrombi within dilated, incompetent varicose veins seem to indicate definitely that such thrombi are negligible factors in the production of fatal emboli.

(2) The candidate for the injection treatment should receive the same careful preliminary study as though he were to be subjected to surgical operation.

(3) This method of dealing with lower limbs varicosities, because of its comparative simplicity and safety and because of the absence of both hospitalization and loss of time for the patient, bids fair to supplant the more formidable surgical procedures formerly employed in their cure.

(4) The writer's method of combining continuous pressure to the entire limb, through the medium of a well-fitting Unna paste boot immediately after injection, would seem to add materially both to the comfort of the patient and the more rapid obliteration of the varices.

MODIFIED UNNA'S PASTE

Glycerine	1900 gm. (1425 c. c.)	10 lbs.
Gelatin	625 gm.	
Water	1900 c. c.	
Zinc oxide	250 gm.	
Phenol	1.50 of total volume	

DISCUSSION *(Abstract)*

Dr. W. S. Anderson, Memphis, Tenn.—I thoroughly agree with the essayist as to the circulation in varicose veins of the lower extremities. There is a reverse circulation, as he has shown in the plates. I also have abandoned the tourniquet, for it does not help, as you can see, on account of the circulation.

In my earlier cases I seated the patients on an operating table, in a chair, had them stand and then sit on the table. I sat on a stool, inserted a small needle, and with a slight suction got the blood into the syringe to make sure that the needle was in the vein and then slowly injected the solution.

I am now putting some of my patients in a reclining position. I have read of a little instrument with which you relieve the vein of all the blood and get the solution in close contact with the walls of the vein. This, I think, may be quite an improvement over our technic.

For the solution, I have used 50 per cent dextrose. With it you will have no sloughing of the tissues and, consequently, no after-worry. In some of my injections I have used a 20 per cent solution of sodium chloride or 40 per cent sodium salicylate. I am using the sodium chloride and sodium salicylate at present. You must use care here not to get either of these solutions into the tissues, for they both will cause a slough which is slow to heal. The veins, immediately after injection, should have pressure on them, and I have tried both A. C. E. bandages and also a small pad of gauze, pressing it immediately over the site of the injection and stripping it down tightly with adhesive. Dr. Baker's treatment is ideal to my mind. In one or two cases I have had a slight slough which has been very slow to heal, producing an old ulcer. I am going back home and put on one of these boots.

In these cases a preliminary examination should be made as in any other type of case. Be sure the deep circulation is potent before injecting the superficial.

Dr. Baker spoke of injecting a pregnant patient. A woman has just been delivered whom I injected beginning about the sixth month. With a previous confinement her veins had become so distended that she had to wear rubber stockings and was in great discomfort. I injected her and the veins collapsed. She went on through her confinement in perfect comfort and now her legs are smooth.

Diabetics can be injected, but do not use dextrose.

The mortality after injection is practically nothing; whereas, with the operative cases, we know there is a certain amount of mortality from embolism. In spite of this there are certain types that have to be operated upon.

The hospitalization is practically nothing; they can be injected in the office, whereas, before, when operations were performed, we had to keep our cases in the hospital two or three weeks and that means a lot to most people. These patients can be injected in the office, have a cast or pads applied and go out to attend to their work.

Dr. J. S. McEwan, Orlando, Fla.—Dr. Baker has brought to our minds one of the old methods of treating varicose veins and ulcers. There are two ways to cure an ulcer: (1) put the patient to bed and elevate the leg; (2) if the patient has to work, "supporting the veins" (and they can be supported by various means).

The only methods of supporting them will be either Dr. Baker's method or a plaster of Paris splint. The old method of rolling bandages, as you know, is not good, as your patient cannot roll them properly and you cannot be with him all the time to put them on.

Excision of the veins by the various methods does not make any difference. It is a question of technic and of support to the veins afterwards. Of course, we who have done many operations for varicose veins in the past, stripping of the saphenous, various incisions, and so forth, have had all kinds of results and the patient has gone on with varicose veins just the same.

Now, with the injection method, these patients get well and we do this work in the office. It is not necessary to take the patient to the hospital, and I believe the only objection to Dr. Baker's method is the time that it takes to put this bandage on in our office. We are inclined when busy to put on the easiest and quickest splint, but by taking the time and pains to use the method described by Dr. Baker, we get beautiful results.

I have injected a good many cases in the past six months. I find that by laying them on the table with their legs hanging down, the veins fill and it is very easy to get into them. The first thing is to be sure to get into the vein. If you do not you are going to have trouble. After I have put my needle into the vein, I pull the leg up into a horizontal position and then by stripping the vein one or two inches with my fingers, inject the fluid, holding it three or four minutes. That is all that is necessary to do. Put on a splint or not as you desire. Stand them on their feet and put them to work.

Dr. J. W. Alsobrook, Plant City, Fla.—I agree with Dr. Baker that continuous pressure is beneficial in the severer or ulcerated cases. I do not use it as a routine and most cases can be treated just as well without it. No mention was made in this paper of the cramp often complained of immediately after injection. It is sometimes severe and lasts from one to three minutes. It seems worse when we use 20 per cent sodium chloride solution.

Dr. E. T. Newell, Chattanooga, Tenn.—In 1926, while I was in Florence, Italy, I saw Professor Boetcher inject varicose veins with tincture of iodine in what appeared to me to be a ruthless manner. All of the American surgeons who were present expected to see some catastrophe or later to hear of the death of the patient. But Dr. Boetcher had had so much experience in this work, as many European physicians have had, in the previous ten or fifteen years, that he did not seem to be worried in the least as to the outcome. However, all of the visiting physicians were not impressed with this treatment for varicose veins and decided in favor of the old surgical procedure for their cure.

Now, since that time, there have been reported over 60,000 cases; McPheeters, with about 0.01 per cent morbidity. Since these splendid reports this method is being generally accepted and adopted as the method of choice in this country.

I have been doing this work for six or eight months and I have gotten to the point now where, like the Italian professor, I am not frightened at the thought of the possibility of morbidity following such injections, having injected quite a number of cases without any complications. The patient gets up from the table in five minutes, goes home, and suffers no inconvenience.

I shall not attempt to describe the technic. There have been mentioned today only a few of the usual sclerosing solutions for injection. I prefer quinine hydrochloride with urethane. No patient that I have ever injected with this drug has ever complained of "cramp in the foot." So I believe this combination is the solution of choice and should be the one in general use.

If you inject immediately over a bony prominence, you are liable to get into trouble. If you get too close to the ulcer, you are liable to have trouble, and, of course, it goes without saying that if you inject outside of the vein, there is a cauterizing effect. If you are careful, and as Dr. Baker said, draw your solution back to be sure that you are within the vein before you go ahead, then carefully and slowly introduce your solution, and clamp down on the site with pressure, you should have no trouble.

There seems to be a diversity of opinion as to whether one should or should not have pressure over the entire limb. This is a very important question. My cases have had no large ulcers and have had very little edema. In those cases that have only the dilated veins, where the skin is not broken, I see no occasion for any general support. However, in the cases with ulcers, which you not infrequently find, it has been my custom to support, not with the special cast, but with a bandage, and have the patient return every two days to have it reapplied.

Dr. C. H. Richardson, Jr., Macon, Ga.—The success of this method depends to a large extent upon the nature of the solution used. We found that a 20 per cent sodium chloride solution would obliterate the vein, but would also cause a slough if any of it was spilled in the surrounding tissues, and anyone who is injecting many of these cases will certainly get outside of the vein sometimes. We also found that 50 per cent dextrose solution would obliterate the vein in a number of cases, but not in all.

Hence, we began to use equal parts of these two solutions and found that the results were as good as when the sodium chloride solution alone was used and as safe as when the dextrose solution was used.

Dr. Baker (closing).—As I said, the solutions which I have used were a 20 per cent sodium chloride and a 50 per cent dextrose. Eli Lilly & Co. now have on the market a sugar preparation, after the formula of von Nobl, representing 75 per cent invert sugar and 5 per cent cane sugar. This, in the hands of those who have tested it, has proven quite satisfactory. McPheeters, in a recent personal communication, states that he is now using this preparation extensively and almost to the exclusion of all others. The differences to be observed when employing these solutions are briefly these: the sodium chloride solutions, and this is quite as applicable to the salicylate solutions, produce sharp momentary cramping, a more extensive venitis and, should even a small amount be deposited outside the vein wall, an embarrassing slough is almost sure to follow; whereas, with the sugar solutions none of these unhappy things is likely to ensue.

Consequently, the novice, at least until confidence in his technic is developed, would act wisely in employing the sugar solutions. Should there be failure to bring about obliteration of certain veins by this means, as not infrequently happens, with even the more cauterizing agents, he can later reinject such veins with the stronger solution.

Another point of importance is the light thrown upon these chemically produced thrombi by the pathologic and experimental studies which have been made. With this evidence in hand, one seems justified in ridding himself of the fear of fatal emboli arising from such procedures. The final and principal point made by the writer was the application of the Unna paste boot to the leg immediately after the injection of as many veins as seemed advisable at one sitting. The milder grades of varicosities probably do not require this type of continuous pressure for obliteration.

In the more severe forms, where the leg is riddled with tortuous varicosities, and more especially if an ulcer complicates the picture, this method of treatment adds much to the comfort of the patient and the healing of the limb. A word of warning, however, should here be sounded: the proper application of this boot, in order to insure the desired smoothness of pressure, requires experience and care; and the limb so encased after injections have been made should be cautiously watched to make sure that nothing goes wrong underneath.

CLINICAL VALUE OF THE ASCHHEIM-ZONDEK TEST FOR PREGNANCY*

By BELO STONE, M.D.,†
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Aschheim and Zondek discovered that during pregnancy there is a striking over production of the hormone of the anterior lobe of the pituitary gland leading to its excretion in the urine. They also demonstrated that the injection of the anterior lobe of the pituitary gland in mice and rats caused marked enlargement of the ovaries.

The diagnosis of pregnancy from urine is based on the demonstration of the anterior pituitary hormone in the urine. No substance which is specific for pregnancy is determined but the hormone of the anterior lobe of the pituitary gland.

According to Aschheim and Zondek the demonstration of the ovarian hormone in the urine is not suitable for the diagnosis of pregnancy, since this hormone in the urine can only be determined in the eighth to the tenth week of pregnancy and not always with absolute certainty. The ovarian hormone can occasionally be demonstrated in the urine of non-pregnant individuals, in cases of functional disturbances, especially climacteric.

The ovarian hormone is formed as a result of the action of the hormone of the anterior lobe

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of the pituitary body. The ovarian hormone is formed in the maturing follicles, which, for its part, brings on estrum; that is, enlargement of the uterus by secretion, and growth of the vagina by cornification of the upper cellular strata.

In performing this test infantile female white mice, varying in age from three to five weeks and weighing from 6 to 10 grams, are used. For every diagnosis 3 to 5 mice are used. Some of the animals may die.

The first voided morning specimen of urine is collected from the patient in a sterile container. The urine is made acid if alkaline and one to two drops of tricresol is added if the specimen is to be transported any distance before injection. If cloudy it is filtered.

Three c. c. of the urine are injected subcutaneously in each mouse three times daily for three days. Two days after the last injection the animals are sacrificed by making them breathe illuminating gas.

The sexual organs, especially the ovaries, are macroscopically examined with the greatest care. If there is any doubt serial sections must be made of the ovaries fixed in Zenker's solution.

It is not necessary to demonstrate the ovarian hormone, but if it is desired, vaginal secretion is taken on the evening of the second day, morning and evening of third day and morning of the fourth day to determine the presence of estrum.

If the anterior pituitary hormone is present in the urine tested it will cause the following reaction in the genitalia of the infantile female mouse:

Reaction I.—Enlargement of the uterus without changes in the ovaries. This is due to the presence in the urine of the ovarian hormone, and not the pituitary.

Reaction II.—The ovary is enlarged to three times normal size. It becomes hyperemic, the vessels are markedly enlarged. Blood dots appear over the surface of the ovary, easily visible to the naked eye.

(There is massive hemorrhage into the enlarged follicles.)

Reaction III.—There is luteinization and formation of corpora lutea. The corpora lutea appear in the ovary as small yellow dots, very prominent macroscopically. The pregnancy reaction is positive when *Reaction II* or *Reaction III* have occurred, that is, if the blood dots or corpora lutea have appeared. *Reaction I*, that is, change in the uterus and vaginal secretion, does not indicate pregnancy, because it is the result of the action of the ovarian hormone.

The percentage of failures in the hands of Aschheim and Zondek is 2 to 4 per cent in a series of about 500 tests. These tests were on specimens of urine from:

(1) Well females in various stages of the menstrual cycle.

(2) From females in the climacteric.

(3) Females of whom nothing was known except that they were not pregnant.

(4) Females with the clinical diagnosis of irregular hemorrhage.

(5) Males (15 specimens), one positive. Following test negative.

(6) Females with internal disease.

(7) Endocrine diseases.

(8) Inflammatory diseases.

(9) Benign ovarian tumor.

(10) Fibroid tumors.

(11) Malignant tumors, one-fifth positive in cancer. Pregnancy and cancer rarely occur together.

(12) Amenorrhea, 42 specimens, all negative.

(13) Normal undisturbed pregnancy, 197 cases.

1 specimen in first week.

32 specimens in fourth to fifth week, most difficult.

36 specimens in seventh to eighth week.

4 failures, 2 per cent.

(14) In puerperium, generally negative on eighth day.

(15) Abortion cases (dead fetus), positive during first four to five days, then negative.

(16) Tubal pregnancy. If negative the tubal pregnancy is not intact (same as abortion).

Aschheim and Zondek also demonstrated that the blood of the pregnant woman contains an abundance of ovarian hormone and anterior pituitary hormone.

These hormones disappear from the blood on the second or third day post partum. The possible means of excretion are the urine and milk. The milk contains only a very small amount, while the urine is very high in both hormones not only during pregnancy, but during the puerperium.

The ovarian hormone and pituitary hormone are excreted in the urine in a quantitatively different manner. This is shown in two curves. The curve of the ovarian hormone rises gradually and slowly in the first eight weeks of pregnancy, then very suddenly until it reaches the climax in the last two months. The curve of the anterior pituitary hormone rises steeply to its climax immediately after conception and remains at its climax from the second week to the middle of pregnancy. From then on, it falls slowly.

Following the technic outlined above we have found this test to be a most valuable one in the early diagnosis of pregnancy when diagnosis by physical examination is impossible. Our percentage of failure in testing a hundred specimens of urine from 90 patients is 5. About 50 per cent of the urine specimens were collected from patients in the hospital while the remainder were sent in by physicians on the outside. In a majority of those cases where urine was collected on the outside the source of the urine and history of the case were unknown, the name and

history being obtained after the report was made. The majority of these specimens were tested to diagnose pregnancy or to eliminate pregnancy. In only a few of the cases was the diagnosis clear. (Diagnosis has been confirmed by operation, delivery or observation in all cases.)

Forty-seven specimens of the 100 series were from women in the early months of pregnancy. Two failures of diagnosis were noted in this group. The diagnosis of pregnancy was made on the third day after the non-appearance of the menstrual period in one case, on the tenth day in another case.

Pregnancy was diagnosed in the second week after the non-appearance of the menses in three cases. In the fourth week in two cases, in one case in the fifth week, in six cases in the sixth to eighth week, in six cases in the tenth to the twelfth week. The remaining cases were a few weeks beyond the third month.

Specimens tested from other cases were as follows:

Fibroid cases, three specimens, one case associated with pregnancy, positive test.

Amenorrhea, 34 specimens, two failures (positive).

Cancer, five specimens, five cases, one positive. One-fifth of the cancers of the genitalia gave positive test.

Ovarian cyst, three specimens, all negative. One case was diagnosed ectopic, later proved to be cyst at operation.

Pelvic inflammatory disease, five specimens, negative. Irregular menstruation, two specimens, all negative. Cardiac disease, one specimen, negative.

Tubal abortion, one case, negative six days after abortion.

Hyperplasia of endometrium, three specimens, all negative.

Abortion, two cases, one positive on fourth day. One negative on seventh day.

Post partum cases, two, one positive on third day; one negative on eighth day.

I am now completing the second series of 100 tests, and the percentage of failures of diagnosis will be about 4.

Causes for failure in the test may be attributed to:

(1) The use of mice that are too old.

(2) Faulty technic.

(3) Mixing of specimens where great number of tests are being carried on at the same time.

(4) Using specimens that are not the first voided morning urine.

(5) Injecting more urine than is specified.

After conclusion of our 100 tests we are able to say that the hormone of the anterior lobe of the pituitary body is excreted freely in the urine during pregnancy and the demonstration of this hormone in the urine is very valuable in the diagnosis of early pregnancy when diagnosis by physical examination is impossible.

This is an accurate test to differentiate early pregnancy, intra-uterine or ectopic from pathological conditions that simulate pregnancy.

The ease with which this test can be performed makes it a very practical one. It requires very little time or training. The microscope is rarely used in the examination. The test can easily be carried out in the office and requires no elaborate laboratory equipment. A few infantile female mice, specimen bottles, acetic acid, tricresol, thumb forceps and small scissors and hypodermic syringe and needle are all that is necessary to carry out the test.

Since this paper was written Dr. Aschheim has reported 1,000 tests with a 98 per cent accuracy.

The technic outlined above differs slightly from that of Aschheim and Zondek.

I am indebted to Dr. Lucius E. Burch, head of the Department of Obstetrics and Gynecology, Vanderbilt University Hospital, for the privilege of carrying out this work.

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HYPOTHYROIDISM WITH REPORT OF A CASE FOLLOWING CURETTEMENT*

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Sir William Gull, in 1873, was the first to describe myxedema, though surely, myxedema and cretinism were known in ancient times.

Hypothyroidism, or the so-called "hypothyroid state," is something of more recent knowledge. This condition, which is a state of debility with lowered basal metabolism is milder in grade than myxedema. Studies in basal metabolism have added much to our knowledge of this condition, as has, also, the administration of thyroid extract in certain hitherto unknown debilities.

This term "hypothyroid state" is used to designate a condition of subnormal thyroid function, in which there is an insufficient amount of thyroxin elaborated and delivered to the tissues,

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but the insufficiency is not great enough to produce true myxedema.

Boothby[1] says of this condition, that "The intensity of stimulation of the thyroid is not sufficient to make the thyroid deliver an adequate amount of thyroxin." Thyroxin has to do with tissue oxidation which is shown by a lowered metabolic rate when there is a diminished amount in the blood.

In a normal individual a nicely balanced equilibrium exists between the secretions of the internal glands. These secretions in their action appear to be antagonistic to each other and when there is impairment of function of any one gland other glands are affected and there is said to be an endocrine imbalance. Well known is the influence of the thyroid in stimulating ovarian activity, and vice versa. Williams[2] says, "An equilibrium exists between the secretion of internal secretory glands because they exercise physiological antagonisms to each other." McDowell[3] in speaking of the internal secretory balance, which he calls the "sympathetic-parasympathetic balance," says, "We divide endocrine glands into two groups, related to exercise and rest respectively." He places in the active group, the pituitary, thyroid, suprarenal medulla and the thymus; in the rest group he places the pancreas and the suprarenal cortex. The first group are concerned with the emotions which precede and accompany exercise and are, also, responsible for one's adaptation to one's environment. The latter group are concerned with the building up, storing and preparation of energy for utilization in the tissues. He says:

"The action of the first group inhibits the action of the pancreas which allows more sugar to be thrown into the blood for increased muscular work." Joslin[4] says, "Feeding the thyroid gland to normal animals in certain cases has resulted in the lowering of the assimilation of glucose according to Cramer in a decrease in the quantity of glycogen stored in the liver. Conversely, thyroidectomy in normal animals increases the tolerance for carbohydrates and leads to hypoglycemia."

The function of the thyroid and anterior lobe of the pituitary seem, in some way, quite definitely related to each other. Wegelin[5] reports a striking hypertrophy of the anterior lobe of the pituitary in 20 or 24 cases of infantile myxedema.

The effect of ovarian secretion on the thyroid is shown by the work of Murlin and Bailey.[6] They noted a decrease of metabolism from 6 to 17 per cent in bitches after castration, together with a gain in weight for the diminished tissue combustion. Price[7] is quoted as saying: "It may, therefore, be suspected that the removal of the ovarian influence actually reduces metabolism through cessation of stimulation of the thyroid."

The case I have to report is one of hypothyroidism following a post abortion curettement, and in this connection it is interesting to note what Bendler[8] has to say about the effect of the endometrial secretion upon the ovaries. He says:

"Decided atrophy of the uterus may occur after a too thorough curettement, and this can be understood when we realize that the endometrium stimulates the ovary and the ovary stimulates the endometrium."

This glandular antagonism has been noted by many authors.

Harrison[9] has shown that excessive thyroid feeding is counteracted by insulin, and Burns[9] showed that pituitary extract counteracted insulin.

Though thyroxin is concerned primarily in the process of body oxidation, its presence in the blood is an essential stimulant to other glands. A decreased amount in the blood has a depressing effect on the ovaries, testicles, pituitary and other glands. It has also been noted that impaired function of these glands in turn depresses the thyroid. Churchman[10] has reported four cases of myxedema following the menopause and one following castration.

The acute infectious febrile diseases, in many instances, as noted by Marine,[11] seem to exhaust the thyroid. Williams[2] says: "Every convalescent from acute infectious disease is potentially subthyroid." Janney[12] says: "A number of recent clinical and pathological observations have indicated the considerable part played by infection in the etiology of hypothyroidism."

The absence of iodine in the diet is a factor in its causation, since without sufficient iodine normal thyroxin cannot be produced.

The signs and symptoms of mild hypothyroidism are like those of myxedema, but usually in less degree. There may be dry skin and hair, lowered pulse rate, mild sensitiveness to cold, gain in weight and constipation; there may be occipital headache and a little puffing of the eyes; there are usually mental depression, fatigability and general muscular pains.

The "signe du sourcile" is often mentioned, in which the outer half of each brow is thinner than the inner half. This sign is more often to be found in myxedema.

The reduction of basal metabolism is the

most constant single evidence. Though other conditions may be responsible for a lowered metabolic rate, it may occur as a result of pituitary involvement, starvation and in the maniac depressive psychoses. Higgins[13] says:

"A lowered metabolic rate is not sufficient evidence in itself to indict the thyroid gland primarily, unless there is also present one or more of the following sextette, namely: dryness of the hair, dryness of the skin, myxedematous swelling, sensitiveness to cold, vague indefinite pains, and fatigability.

"The management of true incipient hypothyroidism involves not only the administration of thyroid extract, but also the much more difficult task of searching for and correcting the factors which may contribute to the development and continuance of the thyroid deficiency."

The treatment consists essentially in the administration of thyroid extract. Sturgis[14] suggests that the treatment be controlled in all cases and that the dose be determined by the clinical response of the patient, the basal metabolism, the resting pulse rate, and body weight. He says:

"The most satisfactory method is to divide the therapy into two stages: the initial dosage, which is calculated to restore the patient to a normal level of metabolism, and the maintenance dose, which is the smallest necessary to keep the metabolism within normal limits."

As to the details of his treatment I would refer the reader to his splendid article and also the article of Lawrence[15] and that of Hunt.[16]

CASE REPORT

A white woman, married, age 27, came to me February 12, 1928.

Her principal complaint was nervousness. She had been feeling badly since a miscarriage which occurred one year before.

Her family history was unimportant.

She had a uterine suspension six years before to relieve distress in the lower abdomen and back. After an instrumental delivery seven years before she had coccyalgia and pain in the back below the waist line. At the Hopkins she was told she had spinal arthritis. One year before she had an instrumental abortion followed by a curettement. Her menses began at twelve years of age and were regular and not unusual until her baby came seven years before, when they became somewhat irregular and frequently were scant. Since the curettement one year previously they had been very scant, lasting only one day, and three periods she had missed entirely.

She complained of being ravenously hungry and she said eating did not satisfy her appetite. She especially wanted candy, but did not eat it for fear of gaining in weight. Her sleep was usually disturbed by dreams and was not refreshing. She had pain and pressure on the top of her head. She had poor emotional control. She was constipated. She was easily tired and felt sluggish. She complained of hot flashes and had pain in her lower back, worse on damp days. She complained that her hair was falling out.

Her husband said she had spells of extreme mental depression, when she contemplated suicide.

Physical Examination.—She was of the sthenic type. Her skin was dry. Her physical examination was essentially negative except that both tonsils were diseased. Her color was good and there was no edema. There was some tenderness on pressure over the sacro-iliac joint, more to the right, and there was tenderness over the lower sacrum and coccyx. Her height is 165 cm. (5 feet 5½ inches). Her usual weight is 60.32 kilograms (133 pounds). Two months before I saw her first she weighed 74.84 kilograms (165 pounds). Her weight then was 68.94 kilograms (152 pounds). Her pulse was 68 and her temperature was 98°. Her blood pressure was systolic 118 and diastolic 82. On February 15, 1928, her basal metabolic rate was —24 and she was given 2 grains of thyroid three times a day. On March 1, the thyroid was increased to 2½ grains three times a day. On March 12 she came back to see me and said she had menstruated since she saw me last and that she had a much better flow, lasting two days. She complained of being nervous and had slight tremor of her extended hands. Her pulse was 102 and she had lost nine pounds in weight. Her basal metabolic rate was +28, her thyroid was reduced to one grain three times a day. During the latter part of March her tonsils were removed. On April 4 her basal metabolic rate was —16 and on June 18 her basal metabolic rate was —29. Her thyroid extract was increased to two grains three times a day. On July 7 her basal metabolic rate was —2. I did not see her again until October 26. She had not taken thyroid for three months and her basal metabolic rate was —11. She was then given one grain three times a day which she continued taking for only about a month. She came back to see me on January 28, 1929, feeling much improved and her basal metabolic rate was normal. Her basal metabolic rate was done again on November 29, 1929, and was again normal.

At no time did she have myxedematous swelling, though in March, 1928, there was a little puffing of the eyes. Her complaint was nervousness, mental dullness, fatigability, headache, back pain and constipation.

CONCLUSIONS

(1) She was hypothyroid but not myxedematous.

(2) The curettement seemed to have precipitated the attack of hypothyroidism, though it may have been coincidental.

(3) Under thyroid administration she seemed to have regained her endocrine balance.

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OPERATIVE AND POSTOPERATIVE COMPLICATIONS OF THYROIDECTOMY*

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Though the present mortality of thyroidectomy is as low as 1 per cent, the likelihood of serious complications still exists. Our success depends upon our ability to prevent them, and to combat them when present. Though somewhat overlapping, they may best be considered under two headings: those that occur during operation and those that occur after operation.

Of the first, hemorrhage, both directly and indirectly, is the cause of most deaths: directly, due to loss of blood; and indirectly, due to nerve injuries brought about in attempts to control it, and also to complications which are the result of an anemic state. The control of hemorrhage should be carried out with the greatest care. If it comes from one of the polar arteries it is best to arrest it temporarily with digital or gauze pressure against the trachea. Small forceps may then be placed at a safe distance from the vital structures and the bleeding vessel gradually brought to the surface and exposed. The superior thyroid artery often retracts, and in order to reach it, it may be necessary to divide the ribbon muscles transversely. Placing clamps blindly in a pool of blood is certain to lead to injury to the recurrent nerves, and its direful consequences. Another alarming and often confusing hemorrhage is that from a lateral vein, or the internal jugular vein which is frequently adherent to recurrent goiters. Here medial compression is of no avail, and only after considerable blood has been lost is lateral compression tried and found effectual.

It is better to let the patient lose considerable blood than to risk an injury to a recurrent laryngeal nerve. A suitable donor should always be at hand and the patient should be transfused immediately following a hemorrhage. This will tend to prevent those complications which follow upon an anemic state, and also will place the patient in a safer condition for a possible second hemorrhage.

Next in frequency and importance is laryngeal obstruction. The characteristic stridor caused by difficulty of inspiration is only too familiar. Frequently it is due to traction on the gland. If this is the case, it is readily relieved by releasing the traction and flexing the neck. Should it not clear up immediately, it is due to a temporary or permanent injury to the recurrent laryngeal nerves. Should the patient complain or show any signs of labored inspiration, a tracheotomy should be done at once. Inspiratory stridor is the sole indication for a tracheotomy: cyanosis, rapid pulse and exhaustion are signs that it has been deferred too long, and that much of the patient's physical reserve has been wasted. Should the obstruction clear up, the tracheotomy may be closed at the end of the operation. Injury to the recurrent nerves is prevented by avoiding traction on the gland and by keeping the operation within its capsule.

Tracheal collapse does occur, but is rare. An intrathoracic or malignant goiter may cause softening and deformity of the tracheal cartilages. Even in these cases, the collapse is generally secondary to recurrent laryngeal nerve injuries.

Novocaine poisoning is generally due to injecting the solution intravenously; if we use 0.5 per cent solution, it is seldom that we give enough to produce it otherwise. It is characterized by twitchings, convulsions, coma and shock. It is treated by forcing fluids and giving sedatives. The danger of its appearing is much lessened by giving barbital preoperatively.

Of postoperative complications hemorrhage again assumes the major role; however, it manifests itself somewhat differently. An occasional case is unavoidable, but most can be prevented by having the patient cough forcibly before closing the wound. A serious hemorrhage is due, of course, to the slipping of a ligature. The blood may escape to the outside. If so, so much the better; otherwise it will cause so great a

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pressure within the neck as to suffocate the patient. The only treatment is immediate release of the pressure, cleaning the wound and locating and carefully ligating the bleeding vessel. Control by packing is to be deprecated, as it is seldom effectual, and it always exposes the nerves to injury. The loss of blood should be made up by transfusion.

At times a small artery or an open vein causes a hematoma under no great pressure. In these cases it is better to evacuate the clot and ligate the bleeding point. Healing is better and quicker.

A tray of sterile instruments and drapes should be kept on the ward with postoperative thyroid patients. Much valuable time can thus be saved in controlling a hemorrhage and performing a tracheotomy. These operations are generally simple, but may be very difficult and should never be performed without an assistant and an anesthetist. They are best done in the patient's bed.

Laryngeal obstruction seldom occurs after forty-eight hours. If it occurs, a tracheotomy should be done, for the tendency is for it to increase and not subside. These patients are very restless and are given a great deal of morphia, so much so that after the tracheotomy there is danger of respiratory paralysis. In caring for a tracheotomy wound a suction machine is often indispensable in keeping the patient from drowning in his own mucus.

Dysphagia is frequently associated with bilateral recurrent nerve paralysis. Anything that these patients attempt to swallow goes down their larynx. They soon become exhausted from choking and acidotic from starvation. The danger of aspiration pneumonia is great. The treatment par excellence is the early insertion of a small tube through the nose or the mouth into the stomach. This has to be done under direct vision. Otherwise, it frequently enters the larynx. Through the tube the patient is easily fed, even while sleeping. The dysphagia invariably clears up in a few days.

Tracheitis is a predisposing factor in pneumonia. It is prevented by not stripping the trachea too bare. Laryngeal obstruction is a decided causative factor in pulmonary atelectasis.

In spite of Lugol's solution we still see occasional severe postoperative crises, probably the result of an operation too radical for the patient's condition. This reaction has three main component parts: (1) that due to acidosis, (2) that due to wound absorption, and (3) that due to the thyroid itself. The first is prevented by giving an abundance of fluids and glucose, the second by adequate drainage, even packing the wound wide open, and the third by Lugol's solution. With this knowledge available, provided that the patient is properly prepared, it is almost inexcusable to lose a case in this manner.

Acute dilatation of the heart is an alarming and not infrequent complication. It is more likely to occur in patients with hypertension and some myocardial damage. It may be precipitated by the strain due to a laryngeal obstruction. It is manifested by restlessness, orthopnea, cyanosis and a greatly dilated heart. It is generally prevented by sufficient morphine and digitalis. It responds most readily to morphine and venesection.

Wound infections practically always occur at the time of operation and not on the ward. Though appearing to be limited to the subcutaneous tissues, they invariably extend behind the muscles.

One type due to *B. coli* causes early a high risé in temperature and a very toxic state. It responds like magic to simple drainage and the wound heals almost *per primam.*

A more troublesome type is due to the staphylococci. It is detected later. The temperature is still elevated on the third or fourth day. Upon separating the skin edges there is a profuse thick discharge. The only way to clear it up is to separate the muscles in the midline and irrigate regularly behind them with Dakin's. Remarkable to relate, the resulting scar is passably good. If plastic work is necessary, it should not be attempted before a year has elapsed.

Mediastinitis is very rare. It is to be guarded against by free drainage in cases of intrathoracic goiter.

Tetany of any severity is rare, but when present is probably the saddest and most troublesome complication. Strange to say, the chronic form does not seem to occur in men. Tetany is manifested by a positive Chvostek's sign, carpopedal spasm, and convulsions. It is due to a removal of or injury to the parathyroid glands. Though normally on the posterior surface, they may be on the lateral or anterior surface and thus may be inadvertently destroyed. If the tetany appears early, it is generally only transient. However, if it appears after a week it is likely to assume a chronic form. Collip's parathormone is most efficacious in controlling the symptoms. If it is unavailable, magnesium sul-

phate intramuscularly is very good. In any case calcium chloride should be given intravenously. Parathyroid transplants have apparently given relief in several cases.

In conclusion, the dangers to be mostly feared in thyroidectomy are hemorrhage and laryngeal obstruction. They are best avoided by developing a technic which gives adequate exposure, does not place traction upon the gland, and stays within the limits of the capsule. Once developed, these complications must be dealt with immediately and carefully.

DISCUSSION *(Abstract)*

Dr. C. C. Higgins, Cleveland, Ohio.—It seems to be the tendency to report large series of cases and to cite low mortality rates, but we hesitate to describe the morbidity. Even though the mortality in thyroid surgery is less than 1 per cent, there is no doubt that serious complications still occur.

Frequently we are asked at what basal metabolic rate we consider a patient a safe operative risk. I believe it is an error to rely upon the basal metabolism determination as an index to operability. No mechanical contrivance can surpass our clinical judgment in the management of surgical cases.

As Dr. Prioleau mentioned, a knowledge of the anatomy of the thyroid gland, of the adjacent blood vessels and nerves, is essential for a surgeon dealing with pathological conditions of the thyroid. The recurrent laryngeal nerves are altogether too frequently injured in thyroid surgery.

No case should be operated upon for goiter without a previous examination of the vocal cords, and the vocal cords should be examined again before the patient is dismissed from the hospital.

A small percentage of patients with unilateral paralysis, which is usually of the abductor type, give no clinical evidence of injury during or after operation. That is easily understood if we recall the position of the vocal cords and the effect of abductor and adductor paralyses.

Divergent views exist as to the actual anatomical position of the recurrent laryngeal nerve. As a general rule, in an anterior-posterior view, the nerve cannot be seen as it lies in the tracheo-esophageal groove. In a dissection of 100 cadavers this was verified. The location is differently described in Morris' "Anatomy," in Cunningham's and in others.

I believe the true location is illustrated only in Pauchet's text-book. In his illustrations the trachea has been removed to illustrate the position of the nerve in the anterior-posterior view. Of course the lateral view gives an excellent exposure of its actual position.

Why is it that we get paralysis in some cases and not in others? In about 40 per cent of cases the recurrent nerve crosses the thyroid artery instead of passing behind it. If the hemostat, therefore, is not kept at the lower pole in the gland substance itself, the nerve will be grasped. In the other 60 per cent of cases the nerve passes under the artery, but even then it may be injured if the hemostats are not kept in the gland substance.

I shall illustrate at this point the division of the nerve in the region of the upper pole of the thyroid. These two terminal branches of the nerve are small and can be easily injured by traction. In delivering the upper pole of a gland which has passed behind the trachea the nerve may be injured.

In about 20 per cent of cases the superior thyroid artery is close to the trachea before it divides into its terminal branches, and it lies in close proximity to the nerve. As the common tendency in applying hemostats is to overshoot, therefore, the hemostat should be made to grasp the superior thyroid artery by applying its point away from the nerve and not toward it.

The other point at which the nerve may be injured is in the region of the lateral vein. Here the vein may dip down deep into the thyroid gland, and if hemorrhage occurs the nerve may be injured in the effort to arrest the bleeding.

The type of recurrent nerve paralysis which appears three or four months after operation is due, I believe, to scar tissue formation about the nerve.

Finally, I wish to emphasize the importance of early tracheotomy upon a patient who requires it. Watchful waiting spells mortality. We usually advocate making the tracheotomy opening between the cartilages; that is, by using a transverse incision instead of a vertical one.

We must attempt to eliminate the morbid features of thyroid surgery, that is, tetany, hypothyroidism and recurrent nerve injuries.

Dr. Frank P. Strickler, Louisville, Ky.—I am wondering where Dr. Prioleau has encountered such numerous complications. We certainly do not have them in Louisville. We do our goiter surgery entirely under local anesthesia. We use no gas, ether, ethylene nor other general anesthetic.

We give, preoperatively, veronal, preferably the elixir, 25 to 30 grams, and then inject 0.5 per cent novocaine, doing an infiltration of the skin and a nerve block. Under this type of anesthesia, we eliminate a very large percentage of the complications mentioned by Dr. Prioleau.

The patient is completely under control at all times and when we are working about the recurrent laryngeal nerves we can keep the patient talking all the time. We know when we touch the nerve, for the patient's voice becomes husky. So we eliminate the nerve factor with a straight local anesthesia.

Another factor that we eliminate is the possibility of hemorrhage, because, following local anesthesia, we have none of the strain from nausea and vomiting that follow other types of anesthesia. If we eliminate this, we eliminate the congestion in the large vessels of the neck. We have no slipping ligaments, the patient comes down to bed, goes right on without any nausea or vomiting, and usually drops off to sleep. Local anesthesia also permits operation upon serious cases of auricular fibrillation which could not be submitted to surgery under general anesthesia.

I have had no recurrent laryngeal nerve injuries and no secondary hemorrhages under local anesthesia.

If under local anesthesia we ligate the superior thyroid arteries first, they control 75 per cent of the blood supply of the thyroid. All the lymphatics, and nearly all of the nerve supply, follows the arteries, and we have little trouble from hemorrhage. Very seldom is it necessary to ligate the inferior thyroid artery outside

the capsule of the gland. Occasionally we do see a large artery and have to ligate it, but that is not the rule at all. We ignore the inferior thyroid artery, unless we feel, on palpation, a very large pulsating artery. Then we ligate it. If we catch the vessels inside the capsule of the gland we need not worry about nerve injury while we are doing our work.

The inferior thyroid arteries supply the parathyroids with blood, and it is not good surgery to destroy the parathyroid blood supply completely.

I never hesitate to pack a case if I think the patient is liable to have a hemorrhage.

It is all right to talk of normal anatomy when you have it, but in the presence of a large thyroid gland, the anatomy is distorted. I defy any man to tell me where the recurrent laryngeal nerves are located in a large goiter with distorted anatomy.

DIAGNOSIS AND TREATMENT OF DISEASES OF THE THYMUS*

By JESSE B. JOHNSON, M.D.,
Galveston, Tex.

In presenting to you my observations on the study of the thymus gland during the past ten years, it is not my intention to delve into the endocrinology of the gland and its relation to other glands of internal secretion. This study, if we were able to master it, doubtless would check the volumes of literature contributed annually on this elusive organ. Since we cannot solve the secretory function of this organ, it is possible that if I can bring the truths as observed in my own work with sufficient force, some little lives may be spared.

Let it be remembered that there can be no definite fixed size or shape for a normal thymus at a given age, the size and shape being a variable factor in the thymus as in noses, feet, stomachs and all other anatomical structures and organs; that the thymus has a function to perform up to the time of puberty; that often a gland of considerable size may be present in the young without clinical evidence of its existence; that cases are frequently encountered with a symptom complex, some mild and others serious and quickly fatal; that the x-ray offers an accurate determination of the size as well as the changes in the size that occur from time to time during treatment; that radiation therapy offers a safe and sound method of treatment.

The determination of a normal thymic shadow for a given age after birth is a great problem in my work. Confronted with the convincing, scientifically proven fact that the organ has a function to perform, and that patients die suddenly with and without known excitable cause, in whom the pathologist can find no disease other than the abnormal thymus and its intimately allied condition, status lymphaticus, one is often at a loss to offer a scientific opinion regarding a normal sized gland. Certainly small thymic shadows may accompany serious symptoms. However, generally speaking, in my experience, the symptoms vary in direct proportion to the size of the gland. I have also seen new born babies whose breathing was started with difficulty show very large thymic shadows, and some of them have died only a few days after birth. Many of my associates have recognized this fact and many patients have been treated in the first few days of life with gratifying results. The general disbursement of information regarding the early diagnosis as well as the typical thymic syndrome, I attribute to Dr. Boyd Reading, Professor of Pediatrics in the University of Texas and John Sealy Hospital at Galveston, Texas. Surely in the light of all the specimens presented in the literature from the different anatomical and pathological museums and the roentgenograms reproduced, no fixed centimeter rule can be given as to size, shape and position of the gland at a specified age. Only an approximate size can be given, and in my work I have chosen to classify them as small, medium and large.

No specific function can be given to the gland *per se*. It is not essential to life, as has been proven by experimental work. Research gives positive evidence that the gland plays a part in the development of the individual up to the age of puberty, because after puberty the gland begins to undergo involution, suggesting a close relation to sex development. In this connection it is interesting to observe that no known ill effects have ever been recorded from the proper use of radiation for control of thymic symptoms. Many beneficial results both as to control of clinical symptoms and reduction in size of the gland have been observed. This fact alone, observed quickly after small doses, gives positive evidence of control of toxicity.

The existence of a fair-sized symptomless gland is familiar to each of us. The finding of the organ while doing chest examinations for other conditions is almost a daily occurrence, but the most of them that I have seen could not be classed as large. Small or medium sized

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glands should not be considered seriously unless some operative interference is anticipated, or unless the gland can be classed as at least larger than small. Personally, I should dislike very much to take the responsibility of operative interference even in patients with small glands, without radiation. It has been my unhappy experience to see death occur when the glands were not very large. If the patient has slight symptoms of thymus toxicity or indefnite symptoms that may be attributable to a small thymus, surely that little patient should not be denied radiation therapy, because the ill effects of this type of treatment in the hands of a well trained man are nil. The recent article by John M. Barnes[1] in the *American Journal of Roentgenology* in a fairly large follow-up series of cases confirms the observations of most of us that the late ill effects of scientifically treated cases cannot be found.

This brings us to the more interesting group, those presenting clinical symptoms of thymic disease. Personally, I have sought carefully for systematic clinical and autopsy evidence of pressure symptoms and findings sufficient to account for the extreme thymic attacks and death producing pressure evidence, and in most cases have not found it. Why should pressure symptoms be present sufficient to produce extreme cyanosis, shock, cessation of respiration and exhaustion, after which the pressure quickly relaxes and the patient returns to normal? If pressure effects do produce death, why do not the autopsies always show the same positive consistent evidence, since the patients practically all die the same way? Why do not the cases with evident pressure on a bronchus show the massive atelectasis which occurs in adults? How does the thymus with the most bizarre shape and pressure effects, situated anywhere in the neck or chest, produce the same type of death in each case that dies? I do not believe that it is always, if ever, a purely mechanical problem, but that a specific toxic substance is formed by the thymus which is liberated under conditions of excitement and after certain types of stimulation, or perhaps in some cases from the extreme size, large quantities of this substance may be liberated and produce quick symptoms and death. Thymic death is probable in the cases reported in the newspapers where the child is found dead in bed or the cat is said to have smothered it or the mother rolled on it, or where some other superstitious cause is given for the death of the child. It remains for us to prove that many of the still-borns who did well until time for them to breathe are not thymic cases. Many children born normally, whose breathing is started after prolonged work, may come under this group.

As a general rule, the toxic symptoms vary directly with the size of the gland. In practically all sudden deaths a large gland is found. The location and shape of the gland has little if anything to do with the symptoms observed. Surely there must be some other factor than pressure. Is it not possible that the organ secretes a substance which has a function to perform bearing on development which, when formed in excessive amounts, is toxic, producing respiratory failure under some form of excitement or stimulation?

The x-ray diagnosis is accurate regarding the size of the organ; the principal dependence being placed on the antero-posterior film. The size of the organ in most instances gives you an accurate idea of the relative danger. Certainly the size of the gland has an important bearing on the advice you are going to give the referring physician and the family.

The roentgenogram gives you a very valuable follow-up record in treatment. We have all seen the gland gradually disappear. The clinical evidence should also be taken into careful consideration when we are to consider the advisability of further treatment. The change in size is more important. It is difficult to estimate the true value of radiation in these cases, because we cannot accurately know what might have happened if the child had not had treatment. We can only judge what may have happened by what has happened to others. The size of the gland, the age of the patient, and the toxicity will determine the course to be followed. If the gland is small and the patient young without symptoms of thymic toxicity, and if nothing unusual such as administration of an anesthetic is to be done to the patient, he should be left alone. If anesthesia or operative interference is anticipated, I should advise the physician that it would be safer to administer a medium dose of radiation front and back and then wait for a few days before interfering.

If the gland is medium sized, is giving no symptoms and the patient is to have anesthesia, two series of treatments at three weeks intervals would make it safer.

If the gland is large, the patient, I feel, should be treated regardless of symptoms. All patients presenting symptoms in whom a gland is found

should surely have treatment. None of the treated cases has had trouble from operation or following it. Always remember that the younger the patient the more sensitive the gland, and also the smaller the chest the smaller the dosage required.

The end-results in these cases were never more forcibly brought to my mind than while I was having this series of youngsters return for follow-up films and observation. Several of them I well remember in my office one or more years ago, having the most horrible attacks imaginable. On several occasions I have tickled the epiglottis with my finger before the child changed its color from indigo blue to white again. That they have come into my office with the flush of youth and health, symptomatically well and radiographically improved or restored, convinces me that we have rendered a real service.

If the patient has developed status thymicolymphaticus, therapy in my experience has been of no value, at least in the cases that are having continuous convulsions. I cannot offer an opinion as to whether or not it does harm. In these cases I feel that it is too late to do good.

REFERENCES

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DISCUSSION (*Abstract*)

Dr. W. R. Bethea, Memphis, Tenn.—About two hundred and fifty years ago, Morgagni found enlarged thymus glands in a series of children dying suddenly from an unknown cause. He attributed the deaths to the thymus. There is very little positive information as to the function of the gland. There are symptoms attributed to the gland that are familiar to us all.

The cause of symptoms has been a subject of wide discussion and there are many different opinions. The two most common theories are that pressure, or internal secretion and toxemia, account for them.

I agree with the essayist that there is a toxemia. Pressure may produce some changes in the rings of the trachea as cited by Dr. Jackson, but does this pressure produce a sudden paroxysm or death? One sees cases of empyema where sufficient pressure is exerted to displace the entire upper mediastinal shadow to the opposite side of the chest. There are pneumothorax, tumors of the upper mediastinum, and enlarged mediastinal glands with no such symptoms as are encountered in thymic disease. One is forced to consider seriously the secretion or toxic theory.

Could it not be true of these children who have an enlarged thymus that, during a fit of anger or fright, stimulation from anesthesia, or in the struggling from the anesthesia, a combined pressure by muscular action, expansion of the lung, and probably increased heart action is produced which liberates from the thymus gland sufficient excretion to produce a toxic effect and a thymic attack? Those cases that do not die of this attack may be able by natural methods to dilute with some of the body fluids this toxin and relieve the attack.

Vomiting is an important symptom not mentioned by the essayist. A few cases referred to us for confirmation of the diagnosis of pyloric stenosis were found to have enlarged thymic shadows. Radiation relieved these symptoms and reduced the shadows. One would think in such cases that reduction in the size of the thymus relieved the toxemia.

The blue baby who is constantly blue is usually a heart case. In the blue baby who is intermittently blue we should look for thymus trouble, although we may rarely have both in the same patient.

The question of further harmful results from treatment has been very ably answered by Dr. Barnes.

Dr. Louis Daily, Houston, Tex.—This subject is of interest to the nose and throat specialist. We all hear of sudden deaths occurring during tonsillectomies. In young children the death is attributed to an enlarged thymus, and this possibility should be considered every time we put a child under an anesthetic. Recently we have bronchoscoped five babies, the youngest six weeks old and the oldest one year and one-half old. All these cases were referred by the pediatrist. About the same history, cough, husky voice and dyspnea, were noticed in all of them soon after birth. The progressive dyspnea brought them to the physician. Two cases improved under x-ray treatment, two were lost sight of. One child died of suffocation and convulsions in spite of x-ray treatments by a very competent man. This case was of interest in that the first pictures showed an enlarged thymus, but after a few treatments the x-ray did not show the enlarged thymus any more. The autopsy revealed a very large thymus placed low and covering the heart. This difference can be explained by the fact that the thymus changes in shape and size. During a crying or coughing spell there is a congestion and engorgement of blood in the thymus and it enlarges. It is much smaller when the child is quiet. In the three youngest cases there appeared to be a flattening of the anterior wall of the trachea, suggestive of pressure. One cannot always be absolutely sure that there is a compression of the trachea in babies six or nine weeks old. The trachea at this age is small, the rings are soft and any twisting of the head or any upward or downward movement of the tube, no matter how small, will affect the shape of the lumen of the trachea.

Last year a three-year-old child died of sudden respiratory failure five hours after an emergency tracheotomy for the relief of dyspnea. This was a case of recurrent laryngeal papilloma, and we had operated upon the child one year previously with an apparent cure. The radiograph was taken when the child was first seen and the autopsy revealed a very large thymus. Had the thymus anything to do with the death?

Dr. Fred M. Hodges, Richmond, Va.—Those of you who were at the last meeting of the American Roentgen Ray Society remember that Dr. Jackson stated that in practically all of the cases of enlarged thymus they could demonstrate actual pressure upon the trachea.

Just how far should a roentgenologist go in making a diagnosis of enlarged thymus? Dr. Pancoast believes the only absolute method is to make a lateral plate

where you can demonstrate the buckling of the trachea or pressure on the trachea. As far as I have been able to tell, it is impossible at times to demonstrate an enlarged thymus gland. The gland is usually enlarged laterally, but it may be enlarged antero-posteriorly. Whether the plate is made during inspiration or expiration or with the patient quiet or active is important. If one of these little patients has symptoms he ought to be treated, whether or not we can show an enlarged thymus.

Dr. R. T. Wilson, Temple, Tex.—There seems to be no definite relationship between the symptoms and the pathological findings, because the enlargement may be so situated as to be partially obscured by the normal mediastinal shadow. This is borne out by the fact that some children have very pronounced thymic symptoms with little or no demonstrable enlargement, whereas others may show considerable enlargement with only minor or moderate symptoms. Therefore, we agree with Dr. Hodges that where there is a doubt the treatment should be given. We should not depend solely on the x-ray findings because the small dosage necessary could hardly damage the child.

Dr. F. K. Herpel, West Palm Beach, Fla.—In the Pacific Northwest I saw many of these patients. It was our impression that there was a relationship between maternal hyperthyroidism and goiter and enlarged thymus glands of children, and that enlarged thymus glands were found more often in mothers with hyperthyroidism than in normal ones.

The production of the symptoms of thymus enlargement by mechanical means rather than by a toxin seems logical. The fixed and relatively small size of the superior aperture of the thorax, with an enlarged thymus gland tamponing itself into this aperture, pressing on the structures passing through it, and particularly the trachea, appears satisfactorily to explain the symptoms encountered. I have been forced to rely largely on the clinical findings as an indication for therapy. I have seen definite clinical improvement after a diagnostic exposure of 40 ma. seconds at 48-inch distance, an almost microscopically small therapeutic dose.

Dr. Alfred L. Gray, Richmond, Va.—I cannot reconcile myself to the belief that tracheal involvement or obstruction is responsible for the death of these children in every case. In the first place, when we have a respiratory obstruction or respiratory failure of any sort, there is usually a cyanosis unless there is *pari passu*, failure of the heart. This cyanosis is not always present in thymus cases.

Dr. Daily referred to change in the size of the gland at different times. There is no question at all about that. If we make one film with the child perfectly at rest and then arouse it and make it cry, another in the same position will show very marked changes in the size of the thymus. The explanation perhaps is the difference in the amount of secretion of the thymus or the blood that is there, during excitement or muscular action.

I want to emphasize what several other men have said, that is, that we should not rely upon the size of the thymus at all in determining whether or not the child is having a thymic attack. I have seen a thymus that would fill nearly the whole of the uper thorax that was producing not the slightest respiratory or other difficulty, and in other cases where we could make no definite diagnosis of the presence of a thymus, typical attacks were being experienced.

Dr. Johnson (closing).—I should like to emphasize the pressure effect. If it is a constant, consistent pressure effect, why is it that we have no consistent findings in the chest? Why do we not have a complete collapse? Why is it that the auricle is not empty at the time of autopsy? Why does not autopsy indicate definite and consistent evidence of pressure? None of the leading pathologists to my knowledge has found sufficient evidence to account for a pressure death.

ARSPHENAMINE IN THE TREATMENT OF PELLAGRA: REPORT OF ONE HUNDRED CASES*

By J. Frank Wilson, M.D.,
Jacksonville, Fla.

This paper is based upon experiences during the past five years in the Department of Dermatology at the Jacksonville City Dispensary and the Out-Patient Department of the Duval County Hospital, and we have also included several cases seen privately. It has been our routine custom in the treatment of pellagra to begin at once the weekly administration of arsphenamine, also giving tonics to be taken by mouth and oral instructions as to diet and care. Incidentally, we also do a routine Kahn test and nine of the number showed a plus four. We did not notice that this affected the results, as two cases with positive blood were among the ones which failed to improve. The results which we have obtained seem to us to justify the belief that arsphenamine has a distinct curative action in this disease. During this period we have treated more than 200 cases, but we have limited this paper to a discussion of 100, as we consider this a sufficient number upon which to base our conclusions. Many of our cases had been lost sight of before we could check up on them. These 100 cases represent possibly a cross section of all the work which we have done together with one or two cases which received no arsphenamine at all, and were included for comparison. Most of these cases had received no previous treatment, but we have included among this number 40 which had been treated by private physicians, but without arsphenamine. Of the patients treated medically, most of them had shown little or no improvement and some had been growing gradually worse.

Before taking up an analysis of this chart it might be well to discuss pellagra from the more

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or less general standpoint of its etiology, symptoms and diagnosis. It is a disorder of metabolism endemic in certain sections of Southern Europe and for the past fifty years in the Southern part of the United States. Why it should be limited to the South, rather than the Northern part of the country, and why, if it is strictly due to diet, it did not make itself manifest until comparatively recently, is a question that has not been answered. Unquestionably, some deficiency in the diet plays a major part in its causation. Whether this is the sole cause we do not know. There is even a possibility that bacterial infection may play a large part in its causation, after the system has become debilitated through lack of the proper food, and we have seen a number of cases of well developed pellagra in persons who were well developed and apparently well nourished.

There has been considerable work in recent years which has attempted to establish definitely the etiology of this disease, by the Thompson-McFadden Pellagra Commission and later by the United States Public Health Service. Commissions were sent into the South to study this disease in regions where it is most prevalent, some work being done in the Carolinas, some in the institutions of Georgia and Alabama and more recently in the area swept by the Mississippi flood. The experiments of Goldberger and Wheeler[1] seemed to show that there is some relation to a little known vitamin which for lack of a better name is termed P.P. (pellagra preventive). This vitamin seems to be closely related to vitamin B. The disease can be prevented by the use of food known to contain this element and also by feeding the same foods it can be arrested, and the patient brought slowly back to health. This work on the whole is inconclusive and we still are almost as much in the dark as in the days when we considered pellagra to be caused in some vague manner by corn. Until the etiology has been definitely established and a specific cure discovered, our main objective is the relief of symptoms and the cure of the patient, and for this purpose arsphenamine in our hands has proven the most effective agent.

The symptoms before the dermatitis appears are usually of such vague character that a diagnosis is difficult and at times impossible. There is a feeling of depression, digestive disturbances and an antipathy for food, a mild stomatitis and oftentimes diarrhea. The patient has a characteristic anxious expression around the eyes which is so marked that a diagnosis can often be made by this symptom when others are indefinite. The nervous symptoms are much earlier in their appearance than is generally known; it is unusual to see a well developed case with no mental symptoms whatever, though they may be of such mild character as to pass unnoticed, but at times even in early cases they are so pronounced as to constitute a real dementia, closely resembling exhaustion psychosis.

The diagnosis should present no difficulty in a well advanced case or when there is a history of previous attacks, or if other members of the family are definitely affected. There is almost invariably a symmetrical dermatitis on the backs of the hands, which may vary from a mild redness and roughening to a severe dermatitis involving the entire thickness of the skin. Fairly frequently, there is a symmetrical dermatitis at the sides of the neck, sometimes making a complete collar, still less frequently found on the dorsum of the feet. This typical dermatitis, together with the digestive disturbances, stomatitis, burning in the epigastric region and diarrhea, makes a picture hard to mistake. It is remarkable how often the most obvious cases of pellagra are mistakenly diagnosed as gastric ulcer, cholecystitis or as gastritis, a much maligned term. Within the last few days we have seen a case with typical pellagrous gloves, a perfectly formed collar, a severe burning in the epigastrium and diarrhea, with a history of seven years' duration, admitted to the hospital with a diagnosis of gastric ulcer. We have also seen in the past five years several cases which had been treated surgically for various digestive maladies, when the clinical picture was definitely that of pellagra. The dermatitis occasionally presents some difficulty when other symptoms are lacking. Dermatitis venenata or chronic eczema may simulate it closely.

In this paper we do not wish to disparage the general method of treatment. High protein diet, tonics and a change of hygienic surroundings are of the greatest importance, not only for the cure but for the prevention of recurrence. In our cases we prescribed a diet which in most cases our patients were unable to obtain, and we have usually found that for one reason or another our instructions have been very poorly carried out, and in a great majority of cases very poor effort has been made toward raising their standard of living. In spite of this poor cooperation, we have gotten what we consider remarkable results from the use of the arsphenamines. We have used at different times arsphenamine, neoarsphenamine,

and sulpharsphenamine, the end results being equally satisfactory with each. The fact should be emphasized that we treated only ambulant cases able to come to the clinic and sent the advanced cases to the hospital where they were lost sight of by us. This accounts in a large measure for our very low rate of mortality. We have had only five deaths in this series. Three of the cases had had the gall-bladder removed and were very poor risks from the beginning; the other three cases were very far advanced and probably should have been hospitalized without attempting to treat them in an out-patient clinic. In bedridden and very weak patients, arsphenamine should be given in small doses to prevent the shock of violent reaction, and possibly in moribund cases it would be useless if not harmful. But for ordinary cases seen by the general practitioner, arsphenamine offers the quickest and most effective means for the relief of the symptoms. The appetite improves at once, the digestion improves rapidly and it is rare that the diarrhea persists after the first dose; in fact, it is generally necessary to begin the use of a laxative at the time of the second dose. The very nature of the disease militates against permanent recovery and predisposes to recurrences, for as a rule the patients are ignorant and poverty stricken, and are unable or unwilling to change their mode of living. Some few cases on the other hand have definite organic lesions, which have led them to abandon a full diet and confine themselves to one or two articles of food which they consider easily digested, but which prove to be inadequate for their nourishment. Klauder,[2] in 1927, called attention to the fact that pellagra is frequently caused by chronic alcoholism; it may also occur when from a mental disturbance the individual refuses to eat the proper food. It is generally agreed among dermatologists that arsenic is of some benefit, but it is recommended that it be given by mouth in the form of Fowler's solution, or hypodermically in the form of sodium cacodylate. Niles[3] in "The Treatment of Tropical Diseases" recommends sodium cacodylate and iron arsenite on alternate days together with Fowler's solution by mouth. Sutton[4] in his text book sites seven cases cured by arsphenamine and reports one failure. But arsphenamine has not been recommended nearly so strongly as we think it should be.

Our charts are too bulky to be read in this limited time, so an analysis will be attempted which will bring out what we consider their most important features. No age is exempt; our cases range from one to seventy-three years of age, with the majority of cases occurring in the third and fourth decade. There was a great preponderance of females, of approximately 75 per cent, with about an equal division between the races.

Six of our cases received only one dose, one we discontinued on account of severe reaction, but one dose seemed to benefit her remarkably. Another case seemed too weak and we attempted to build her up by diet and tonics alone, but she died. Three showed improvement and one was lost sight of. Sixteen cases received only two doses. One of these failed to show any improvement after the second dose and it was discontinued. Twelve were so markedly improved that we considered two doses sufficient; the others failed to return. Nineteen cases received three doses and of these, we lost contact with one, one showed no improvement, nine were so improved that the arsphenamine was discontinued and they were put on tonics and diet. Eight were apparently cured and dismissed with instructions as to their future diet. Upon discontinuing active treatment we prescribed elixir iron, quinine and strychnine and endeavored to keep track of the patients by having them return each week to have prescriptions renewed. Thus some of our patients who received six or more doses had them at widely scattered intervals, as we occasionally gave one or two extra doses at the first indication of a recurrence.

Fourteen cases received four doses and three of this number died. Two seemed to be growing gradually worse so the arsphenamine was discontinued and we endeavored to treat them without its use, but they continued to decline and one died one month and one four months later. The other death in this group was one of the patients who had had a cholecystectomy and was a poor risk from the beginning, and eleven were symptom-free and were considered well enough for the arsphenamine to be discontinued. Ten cases received five doses each and all of them showed rapid improvement. Only one had symptoms sufficient to warrant further treatment, but had improved enough to discontinue the arsenic and continue the general treatment. Twenty-one were given six treatments. One of these showed very little improvement, and one had a recurrence. Thirteen were markedly improved and six we considered cured. Six cases received seven doses each and all showed improvement, though none of this group was entirely cured. One case received eight doses, one case ten doses, three re-

ceived twelve doses and one fifteen. These were mental cases, and the treatment was prolonged in an attempt to correct the mental disturbance. Physically there was improvement in every one of these cases and one case was completely cured both physically and mentally. Five cases showed no improvement in their mental condition.

Eighty-five of the 98 cases grouped in this chart showed a very marked improvement upon being treated by arsphenamine which is a far better percentage than can be shown by medical treatment alone. Only five of the number died. One of these was a case which refused treatment and is included along with one other case only for comparison. Three of the patients who died had been treated surgically by the removal of the gall-bladder. There will always be a question in my mind as to whether these patients would have died had they received arsphenamine and diet alone, without surgical interference.

There is some mental disturbance even in the mildest case of pellagra, but unless the symptoms were marked we did not classify them as mental. Of the number in the accompanying list, 27 showed enough mental disturbance to be noticeable, but except for the five cases mentioned above their nervous symptoms responded almost as rapidly to this treatment as did the physical ones. One case presented symptoms very closely resembling tabes dorsalis, and though we were never able to obtain a positive blood or spinal fluid test, he gave a history of having been previously treated for syphilis. This is one of the cases that showed no mental improvement, but there is still some doubt as to whether this was of syphilitic or pellagrous origin. One other case showed a complete dementia, which grew gradually worse and had to be committed to an institution.

There are one or two instances that should be brought up which seem to prove it is the arsphenamines which is responsbile for most of the improvement.

Cases 46 to 54 represent a family which was being cared for by the Welfare Board, and also includes one child from a different family who lived in the same neighborhood. The entire family was given the initial dose of neoarsphenamine, varying in size from 0.2 gram for the five-year-old child to 0.6 gram for the adults. The mother was so badly affected as to be unable to attend any of her duties. The children had unmistakable pellagra, but were still able to attend school. The father had probably the mildest case in the family, pellagrous gloves and slight digestive disturbance being his only symptoms. On subsequent visits the father was always absent from home. He left word that he was too busy to stay in, but the mother stated that the first dose had made him sick. The rest of the family received two more doses, making three at weekly intervals. They were supplied with an abundance of food by the Welfare Board, with fresh meat and milk daily, and all other foods were kept replenished as they were used. At the end of three weeks' time all of the family were remarkably improved (the father was not seen at this time). The food supply was continued for about two months after the arsphenamine treatment, when the family moved out of the state. I saw all of the family at this time and not one had the slightest symptoms of pellagra with the exception of the father who showed very little, if any, change although they had all been on the same diet. The child who lived across the road was seen on the last visit to this family

RESULTS OF TREATMENT WITH ARSPHENAMINE

Doses	Cases	Cured	Improved	Unimproved	Died	Lost Sight of
....	2	....	....	1	1	....
1	6	....	3	1	1	1
2	16	....	12	1	....	3
3	19	8	9	1	....	1
4	14	....	11	....	3	....
5	10	9	1	....	....	....
6	21	6	14	1	....	....
7	6	....	6	....	....	....
8	1	1	....	....	....	....
10	1	....	1	....	....	....
12	3	....	3	....	....	....
15	1	....	1	....	....	....
		(24%	61%)	5%	5%	5%
		Total 85%				

Note.—Eighty-five per cent of the above cases were so far improved as to be symptom free and could be classified as cured, but on account of inability to change their hygienic surroundings 61 per cent were classified as improved because of the liability of reoccurrence. Twenty-seven per cent were definitely mental; of these three died, three failed to improve mentally, twenty-one were practically cured. Two cases refused arsphenamine, but were put on the same tonics and diet as other members of the same families who were similarly effected. These two showed no improvement, though the other m mbers were cured.

and, although he claimed to have followed the diet given him and his father said that he drank a quart of milk a day, there was no appreciable change in his condition. This is one of the cases included in our list who had no arsphenamine.

The other case which received no arsphenamine was a white man seventy-seven years of age with distinct pellagra and pronounced mental symptoms. His wife, sixty-three years of age, was also affected with pellagra, but her mental symptoms were not quite so pronounced. The husband refused any treatment whatever, while his wife received six doses. There was a rapid physical improvement in her condition and there seemed to be some mental improvement. The husband's condition grew steadily worse and he died within four months. They were both practically in the same condition when she began treatment. Although she prepared the food and attempted to carry out the diet instructions, it was very poorly done and in my opinion could not have had much to do with her improvement.

In another case a white woman eighteen years of age, married, had a very pronounced case. She was extremely emaciated, weighing only sixty-three pounds, bedridden and entirely demented. She had been treated by diet and tonics, by three different physicians and was growing rapidly worse. She was given five doses of neoarsphenamine and her physical improvement was really remarkable. She had gained fifteen pounds, was able to walk across the room, and her mental condition was greatly improved except for an insane fear of a hypodermic needle. This fear became so great that her mother was advised to take her away from town and keep her with her on the farm. The mother reported some time later that she believed the patient had completely recovered.

Two cases which were seen privately by Dr. Kirby-Smith also illustrate the efficiency of arsphenamine.

The first case was a young girl sixteen years of age, undeveloped, undernourished, with so much mental confusion that she was unable at times to call her own name. She had been treated for months by diet and tonics with apparently no results whatever. She was given six doses of sulpharsphenamine and within two months was mentally bright and had begun to menstruate. A few months later she was married, since which time she has been seen at rather frequent intervals and is leading a normal happy married life. The other patient was a physician's wife, about fifty-five years of age, who had been in a hospital under treatment for months. She was considered to be incurable; in fact, her mental condition was such that steps were being taken to have her committed to the hospital for the insane. She was also given six doses, the last one being given just before she was sent to the institution. After about two months she was sent home symptom-free and has remained apparently well up to the present time.

These special instances, as well as the large percentage of favorable results obtained through the use of arsphenamine, have convinced us that it is the treatment of choice in all cases of pellagra, unless there are contraindications to its use.

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DISCUSSION (*Abstract*)

Dr. J. L. Kirby-Smith, Jacksonville, Fla.—A number of times in the past internists have said to me, "Why submit the pellagra patient to intravenous injections of arsphenamine when diet is all that is necessary?" I have always replied that the class of people in our section who develop pellagra can not provide themselves with the proper food, and the large majority have not the intelligence properly to prepare the food if they should obtain it. I do not question for a minute the value of a proper diet for pellagra patients, but I do say that the rapid action of intravenous treatments shortly produces marked improvement, and more marked than any that could be seen from any dietary measure. Shortly after the introduction of arsphenamine in the treatment of syphilis, one of our profession made a report on the beneficial effects of this drug in the treatment of pellagra (this was about 1911). Since that time I have used arsphenamine as the routine measure in both my private and clinic practice. South Georgia and North Florida are not very prosperous parts of the country, and at certain periods this section has had a seeming epidemic of pellagra. As a result we see pellagra very often.

Dr. Wilson has been associated with me for several years. He has spent much time collecting these statistics and records and from reading them you can appreciate more fully the good results that have been obtained from the arsphenamines, as we have used them. By moderate dosage given at weekly intervals, we have had prompt improvement in the patient's appetite and a general improvement in his appearance, especially in the characteristic pellagra appearance that he has on the first visit. I do not say that the drug is thoroughly curative, but I do say that except for syphilis, I do not know of a single disease that shows a more prompt improvement following any one measure than does pellagra following injections of arsphenamine. My opinion is that arsenic in the form of the arsphenamines is more than a tonic.

Dr. Dudley C. Smith, Charlottesville, Va.—The cases of pellagra in my observation showing most rapid improvement have been those which have received, in addition to dietary treatment, frequent blood transfusions. In this nutritional disease, digestion and assimilation are abnormal. A pint of whole blood, which contains in a preprepared state all of the elements required for proper nutrition, given at frequent intervals, hastens recovery and in the serious case may be life-saving.

Dr. F. R. Taylor, High Point, N. C.—Granting that there is a field for the use of arsphenamine in pellagra, which I think most of us do, as was brought out in the Section on Public Health yesterday, it seems to me there are certain other factors that make it difficult, for me at least, to consider diet the whole story, and the treatment must be bound up in some measure with the etiology. Why, for example, as Dr. Wilson told us today, in Korea and China, where diets are extremely deficient

at times, does pellagra seem to be of great rarity? They rarely see it except for a few cases in lepers. I do not know why it is not seen in the slums of the North. I cited the case here yesterday of a woman, who became very run-down after having had measles; and after a few months on milk and eggs she "broke out with what the doctor said was pellagra." She may not have taken enough milk to prevent it. I should like to ask the essayist if he uses neoarsphenamine equally with arsphenamine in pellagra. Another thing is this: a very large number of these patients appear to have an infection of the mouth with Vincent's organisms. Of course, many persons have Vincent's organisms who have not pellagra. But that may be partly responsible for the difficulty in clearing up sore mouths and the sore mouth may make it hard to get the proper diet into a person. From that standpoint I believe it is worth while. But most certainly I believe that when any medication is used, it should be hammered into the patient that the medication is not enough and is not likely to cure him, but that he has to stay on the diet, and that if he had to choose beween no medication and no proper diet he should do without the drugs and stay on the proper diet.

Dr. Bedford Shelmire, Dallas Texas.—One could hardly have witnessed the epidemic of pellagra in Texas two years ago without sharing with the late Dr. Goldberger the theory that this, like beriberi and scurvy, is a dietary deficiency disease. A house-to-house canvass with this investigator through the cotton mill district of my city revealed pellagrin after pellagrin who related the story of a restricted diet. Up to this time arsenic, either in the form of neoarsphenamine or sodium cacodylate, was used extensively at our Baylor Clinic in the treatment of pellagra with what I believed to be very unsatisfactory results. An increase in weight of the patients treated with neoarsphenamine was noted; yet seasonal recurrences of the dermatitis were not prevented.

After Dr. Goldberger's visit, tomato juice and yeast was added to the high protein diet given pellagrins. Superior results were obtained so that arsenic was discarded. After the essayist's brilliant results reported today, I am convinced that neoarsphenamine has distinct value in the treatment of pellagra and should not be entirely discarded.

Dr. Herbert S. Alden, Atlanta, Ga.—It seems to me that neoarsphenamine in pellagra acts like any arsenical tonic, causing the patient to eat more food containing more antipellagra vitamin.

The use of brewer's yeast has not been mentioned. In Atlanta, we find that brewer's yeast is of great value for the poorer class of patients who are unable to buy proper food.

Dr. Wilson (closing).—We have had no experience in the clinics with the transfusion of blood in the treatment of pellagra. Dr. Smith stated that the digestion of the patients was usually so impaired that they could not take the proper food. It has been our experience that the stomatitis and the digestive symptoms clear up so rapidly under administration of arsphenamine that in a few days they can eat without difficulty.

Dr. Shelmire thinks that arsphenamine is simply a tonic, which it undoubtedly is, but it is our belief that it has a far more definite action than that. While it is not so much of a specific in pellagra as it is in syphilis, yet symptoms clear up almost rapidly. This leads us to the conclusion that arsphenamine has some definite curative properties in the treatment of pellagra. An occasional case of pellagra may develop while the patient is taking arsphenamine. It is also not unheard of for a syphilide to appear while the patient is undergoing vigorous antisyphilitic treatment.

In the clinic we used straight arsphenamine for three years and then changed to neoarsphenamine. Of the former we gave 0.3 gram, but when using the neoarsphenamine we doubled the dose, using 0.6 gram. We have treated about the same number with each and the end results have been equally satisfactory.

VENEREAL DISEASE CONTROL AN ESSENTIAL ACTIVITY OF A COUNTY HEALTH DEPARTMENT*

By JETHRA HANCOCK, M.D.,†
Louisville, Ky.

More than ten years have lapsed since the first conscious effort was made by public health authorities to undertake the control of venereal diseases as a definite public health activity, and we may with some degree of accuracy evaluate the various methods of approach that have been utilized in this effort. It seems to me, as one who was charged with this duty from the very beginning, that our first efforts were incoherent, that we were wandering about following first one lead and then another. The only basis we had was information that had been gleaned from experiences in the World War. We undertook to apply these measures to the civilian population, and the methods that we used in military efforts to control venereal diseases, by their very nature, were not available in civilian life. It might be said just here that, before the close of the War, the leadership of many well informed and highly skilled medical officers, who in civil life had led scientific thought in all matters pertaining to venereal diseases, had so made itself felt that they were able to force through, as it were, a very uniform and sound procedure that was applicable and more or less effective in venereal disease control. Yet in civil life we have lost the control of the men, and we must translate these facts and impressions to physicians and health officers who have not had the experience of those who were especially picked and chosen to do a similar class of work with the army population. Thus, we can see that

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by the very nature of the task our undertaking was a tremendous one, that neither the medical profession, generally, nor the civilian population had any conception of the venereal disease problem. Many surveys were made with the assistance of the United States Public Health Service, much propaganda was put forth both through official and voluntary organization, many of the viewpoints and statements were conflicting, some of them exaggerated. Notwithstanding this maze of uncertainty and lack of information, much good has resulted and it might be said, now, after a ten-year period, that, where suitably sustained effort has been carried on in any given community, the importance of the whole subject is now appreciated, both in the minds of the laymen and the medical profession, with a more or less stabilized conception that makes it possible to correlate venereal disease control with the activities of an organized and well balanced county health unit.

It is with some degree of pride that we may point to the achievements of the State Board of Health of Kentucky during the period of time above referred to. We were fortunate in Kentucky in having the unstinted support of the State Health Officer, who had a large and accurate vision of the importance of venereal disease control as a public health measure. At the beginning fairly ample funds with which to organize this work were provided and we were much favored by the support of the United States Public Health Service, which assigned to Kentucky some of its trained workers. These were of tremendous value to us in convincing the public of the necessity of controlling the conditions. The Director of the Bureau of Venereal Diseases was convinced from the very beginning that nothing lasting would come from sporadic or unorganized effort, however good such unorganized efforts might be, in arousing the public to an appreciation of the injury to public health and economic losses that was chargeable to venereal diseases. It was realized that nothing lasting would come of any effort that was not well correlated with the general public health program. The State Board of Health of Kentucky is definitely committed to the principles of the county health units as the only feasible approach to effective and lasting public health work. We are also of the opinion that venereal disease should be one of the activities of the county health unit, that it should take its true relation to other activities of the county health unit just in proportion to the conditions that exist in the given county, as in typhoid fever, scarlet fever or any other epidemiologic activity. Many of the well established and smoothly functioning county health units were originally established as venereal disease clinics, building up from this to the whole program of county health work. Where venereal disease was over-accentuated the effort has been to bring the other activities up to it, which has naturally resulted in lessening to some degree activities solely for venereal disease control. This has given extreme satisfaction to all those charged with the responsibilities of the county health service.

We shall relate here some of the conditions that existed in given sections of the state of Kentucky. In many of the eastern counties of Kentucky there are large and valuable coal areas, which came into development only about ten to fifteen years ago, and are teeming with foreign population, badly housed, and in bad sanitary conditions. When they arrived, coal was commanding a good price, there was a feverish effort to import labor and materials into these communities, and little or no attention was being paid to the sanitary conditions, even those immediately in or abutting on the coal camps. The resident local population of the areas gravitated naturally to the centers seeking employment, and, as always happens under these conditions, immorality was rampant with its attendant epidemic of venereal diseases of all kinds. Careful surveys and estimations of the prevalence of venereal diseases were made and efforts started to get the local doctors, usually salaried camp physicians, to take care of those who were venereally infected and unable to pay. The conditions that confronted us can readily be visualized. The physician had all the work he could possibly do and was being paid well for it; he could not therefore be expected to take on special free clinical work of any kind. No local physician could be induced to do any part of the venereal disease work for nominal pay. Hence, we saw that it was imperative, not only because of the prevalence of venereal diseases, but because we were confronted by the whole public health picture, to institute organized public health service in these areas.

As was previously stated, many times the first effort was to start a venereal disease clinic with a well paid clinician in charge, inducing the county a little later to add to this by providing nurses and sanitary inspectors and thus receive the state aid for an all-time health department.

Some twenty counties in this area were induced to organize health units to take care of the changed public health conditions that had suddenly come upon them. Many of these health units are approximately five years old and, while the economic conditions have improved, owing to better roads and better living conditions, the transformation has been truly amazing, not only the attitude of the people towards venereal diseases but towards public health procedure in all of its phases. The Rotary Clubs, the Kiwanis Clubs, and women's organizations have all been alive and helpful in this organized effort to control venereal diseases in conjunction with their other public health work.

There seems to be some confusion in the minds of the many public health officials from other states who visit Kentucky as to the initial approach to venereal disease work in a given community. This is usually clarified to them by quoting the rules and regulations which constitute the venereal disease laws in Kentucky, namely:

(a) All persons, either male or female, infected with gonorrhea, syphilis or chancroid treated by any physician or hospital are required to be reported to the State Board of Health through the local health officer.

(b) All persons known to be infected with venereal diseases, either male or female, may be quarantined at the instance of the local health officer, the Director of the Bureau of Venereal Diseases, or the State Health Officer.

(c) All prostitutes are deemed to be infected with venereal diseases and may be quarantined.

(d) All persons who, by common repute, are said to be prostitutes are deemed to be infected with venereal diseases.

(e) All persons, male or female, in association with prostitutes may be quarantined.

It can thus be seen that with these broad powers the health officials are clearly within their right to apprehend any persons who may come under one or the other of the above classifications.

In initiating a venereal disease clinic it has been the custom to have some one go into the community and through the local police and other officials list all of the known prostitutes. On a given day they are brought into the clinic, questioned and examined, and, if found to be infected, they are quarantined or paroled at the discretion of the local health officer and are made to understand that, if they will obey the health officer, they will be treated with kindness and given free scientific treatment so long as they are in the infectious stage. It is through these who are brought in that the word spreads that they will be kindly and well treated. In all instances the county medical society gives its influence to the clinic and just at this time nominal pay clinics are instituted at which small fees are charged, sufficient to defray the expense of the remedial agents used. These fees run from 25 cents to $1.50. In no instance is anyone treated who is past the infectious stage and is known to be able to pay a physician. A card index is kept and a committee of local physicians is in constant touch with the clinic. Many of them give some of their services, and if it is found that any impositions are made by people attending the clinic who are able to pay a private physician this is at once corrected after having a careful investigation made by follow-up workers or sanitary inspectors. Many patients whose economic conditions have become impaired owing to lack of employment are sent to the clinic by physicians. There is a constant exchange between the local private practitioner and the clinics as the economic conditions of the patients change. The clinic sends patients to the private physician and the physician in turn sends patients to the clinic.

Educational propaganda is constantly being disseminated from all of these clinics as to the necessity of long and continued treatment in these maladies, thus getting across a changed viewpoint, displacing the feeling in the minds of patients that they are cured of syphilis when there are no visible clinical manifestations. It has enhanced the income of the local physician through getting to the people a better understanding of the necessity of adequate treatment. This activity has extended to about forty-five counties in the State and we feel that it is one of our best selling factors in securing funds and public sentiment for organizing all-time county health programs. We are extending the work, correlating it with hospitals and teaching institutions of all kinds throughout the State just as other public health work is being extended and correlated.

An understanding of the gravity of venereal diseases is being disseminated through the women's organizations and institutions of learning very largely by the Kentucky Social Hygiene Association, which receives an appropriation of five thousand dollars per year for the furtherance of its work and is definitely joined to the Bureau of Venereal Diseases, State Board of Health. This organization is doing much effective work among the women through the distribution of literature, lectures in schools and

other women's organizations and distribution of literature through their connections with the American Social Hygiene Association. Through its influence the American Social Hygiene National Conference was held in Louisville last year. It was well attended and had a far-reaching influence in Kentucky in spreading the knowledge of the importance of the control of venereal diseases.

We feel we are safe in saying that venereal disease control in Kentucky has advanced to the point that it is a well organized necessary public health activity joined in the normal and proper way to all of our public health work throughout the State. If we have attained any success in Kentucky in venereal disease control, praise is due to the loyal support that I have received from the State Health Officer, my associates in other departments, the United States Public Health Service, and the many business and professional men who have given us their support throughout the State.

DISCUSSION (*Abstract*)

Dr. P. E. Blackerby, Louisville, Ky.—Where the venereal disease program has been carried as a distinct part of the health program, it has had the best support.

In Pike County, Kentucky, where some 60 or 70 venereal disease cases come each week to the clinic, the department is trying to see whether the clinic is being imposed on, and this fact makes for satisfactory relations with the physicians. In that County about three weeks ago the County Health Officer on the front page of the newspaper described the condition of things in the county seat as related to prostitution and venereal disease.

The Secretary of the Chamber of Commerce in reply regretted that an official would put the name of his city in a bad light before the world. The Rotarians and other civic groups replied that it brought credit to any town to show that it desired to rid itself of such conditions. Surely the public respects any locality which will bring the facts of venereal disease incidence to the light in an attempt to rid itself of it.

Dr. Joseph W. Mountin, Nashville, Tenn.—Venereal disease control is not receiving attention of health departments commensurate with its relative importance.

One reason, perhaps, that health officers tend to neglect this problem is that the over-zealous supporters frequently seek to make policemen out of health officers.

There is a place for repressive measures, but the great need at the present time is more adequate treatment. Health departments can assist by (1) providing facilities for treatment of the indigent, (2) assisting physicians in the treatment of the semi-indigent, and (3) by promoting a better understanding on the part of the public regarding the necessity for prevention and thorough treatment of the infected. It should be done on a partnership basis with the local practising physicians.

These, I understand, are the provisions of the plan being pursued in Kentucky.

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CALCIUM IN A SEVERE BONE DISEASE

It is a peculiar fact that substances which are present in quantities larger than normal in the blood stream are not adequately utilized by the body. In diabetes there is hyperglycemia, but sugar is insufficiently burned by the tissues which are starving for it. In certain bone diseases there is hypercalcemia, and calcium is not properly used by the body, which slowly disintegrates from lack of it. One would expect in the presence of an increased amount of the circulating substance, an increased availability of it for the tissues and more abundant utilization. Instead, in both these conditions, with sugar in the first instance and calcium in the second, there is merely a greatly increased urinary excretion of both substances.

About 0.5 gram of calcium per day is normally used by adults for metabolic purposes, and an individual who receives less than that per day withdraws it from his bones. He then excretes more calcium than he ingests, and is said to be in negative calcium balance. Maintenance of a normal blood calcium depends particularly upon the secretion of the parathyroid glands. The level fluctuates, however, during assimilation of sugar[1] and doubtless during digestion throughout the day.

Bone, which used to be considered a fixed frame work for the flesh, in modern physiology is pictured as a mobilizable tissue which stores and releases calcium, just as the liver stores and releases glucose.[2] Bone material is constantly being deposited and drawn upon. In osteitis fibrosa, a rare disease, the blood calcium is very high due to dissolution of the bones, and there is a steady loss of calcium from the body, that is, a negative calcium balance, thought to be due to hyperactivity of the parathyroid glands. In several cases of this condition, the calcium metabolism has been very thoroughly investigated.

A patient studied in New York[2] and Boston,[3] a young sea captain, formerly a picture of good health and physical development, began in 1918 to have pains in his limbs, to grow shorter and to require larger collars. He later became subject to fractures, had difficulty in coordination of muscle movements, had attacks of abdominal pain and vomiting, and became entirely incapacitated. By 1923, he had lost four inches in height, his entire appearance had changed, face and body, and generalized thinning with cystic areas of all the bones, including the skull, was shown by x-ray. Diets high in calcium, phosphorus, codliver oil, thyroid extract, heliotherapy, and various other measures were employed with no improvement in his general condition. He had a blood calcium of 13 to 16 milligrams per 100 c. c. of blood, the normal being 9 to 11. Seven-tenths gram of calcium per day was necessary to maintain him in positive calcium balance. With less than that the negative balance, or calcium loss, was much more marked than in normals. Calcium in normal persons is excreted largely in the feces. In this patient most of it was recovered from the urine.

For diagnostic purposes he was given parathormone. An increase of pain was noted over the body, and a slight elevation of the blood calcium, with increased excretion of calcium in the urine. The figures for his blood calcium

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and calcium excretion from day to day without parathormone, were found to be almost identical with those for a normal man receiving 100 mg. of parathormone daily.

On a high calcium diet the urinary calcium was not increased and the patient could be kept in calcium balance. The abnormalities of calcium metabolism were unaffected, however, by the removal of two apparently normal parathyroid glands. The patient eventually improved to the extent of being able to carry on his work.

A similar case is reported by Hunter,[4] in the *Proceedings of the Royal Society of London*, of a woman of forty-one with joint and bone pains, osteitis fibrosa, attacks of right lumbar pain with vomiting and increased frequency of micturition, fractures, and right hydronephrosis. She also showed diminished density of all the bones, with cyst-like areas, on x-ray. The calcium output was greatly in excess of the intake. The serum calcium was 12 to 15 mg. (normal 10) and the plasma phosphorus was reduced. The patient's excretion of calcium was equivalent to that of an individual under continuous administration of 120 units of parathormone daily. A tumor of the parathyroids was found and removed, following which there was relief from the bone pains, and the serum calcium fell to 8-11 mg. The phosphorus rose. In reviewing the literature of the condition, Hunter says that about fourteen cases have been reported, half of which were improved by operation.

These extreme cases are interesting only as they throw light upon the milder, more frequently occurring conditions. Osteitis fibrosa is considered by many to be merely an advanced degree of rickets. Rickets is practically a universal disease, and in it, earlier manifestations of calcium derangement are frequently encountered in medical practice. For clinicians who have laboratory facilities, routine studies of the calcium balance, that is, the calcium intake in food and excretion in urine and feces, would be useful in pregnancy and lactation, periods of severe calcium drain.

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OVARIAN AND OVARY STIMULATING HORMONES

The ovary and the anterior lobe of the pituitary for many years were like islands on which pirates' treasures were believed to have been buried. Countless explorers with fanciful maps fitted out ships and sailed away to dig for gold, but found only sand and rock. Yet the rumor persisted that gold was there, and the search continued until finally not one cache, but several were found.

Hormones of the ovary and of the anterior lobe of the pituitary, discovered in recent years, highly active substances, mutually stimulating and interdependent in their actions, have been purified so that many of their effects may be observed.

To go briefly over the findings to date, there is one hormone supposedly produced by the Graafian follicle,[1] though its production in the absence of the follicle is said to be possible.[2] This is estrin, which brings on rutting in spayed mice or rats. It has been obtained in a crystalline and apparently chemically pure form,[3] in which in minute quantities, less than a millionth of a gram, it brings on the phenomenon of heat in ovariectomized mice. There is a second ovarian hormone, progestin,[4] apparently produced by the corpus luteum, though it is said that it is produced also in the absence of that tissue.[2] Progestin has been more recently studied, and much less highly purified. It prepares the uterus for pregnancy, for implantation and nutrition of the embryo in the uterine walls. After injections of progestin, nearly any mechanical stimulation of the uterine lining will result in the formation of deciduoma. The period of gestation may be prolonged by injections of progestin. Physiologically its activity follows that of estrin, in lower and higher animals. For menstruation of primates, the sequence of estrin and progestin are necessary. There are thus two ovarian hormones, estrin and progestin, whose functions are to some extent established.[5] But the ovary and testicle do not of, and within,

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themselves after a certain age and period of inactivity mature and develop. They depend for their stimulation upon their environment. They are activated by other cells within the body. Their senescence also is due to changes outside themselves, when the stimulus to activity fails, according to Weisner and Crew,[2] of Edinburgh.

A number of workers have shown that repeated transplantation of fresh anterior pituitary lobe into immature animals induces rapid development and sexual maturation.[6] Injections of certain pituitary extracts have the same effects. The active extracts have been for the most part rather crude preparations, although Collip has reported a crystalline substance extracted from the placenta, identical with the anterior pituitary secretion, and active by mouth. Collip,[7] taking as his starting point the previous work of Weisner, postulated only one anterior pituitary sex hormone which induced maturation and cyclic changes in the ovary. Weisner and Crew,[2] after further work, describe two hormones of the anterior pituitary, one acid soluble and one alkali soluble, both essential for the ovarian cycle. One stimulates what they call the estrogenic phase of the ovary, the other the kyogenic. One stimulates the liberation of estrin from the ovary, the other the liberation of progestin. The two pituitary hormones are mutually inhibitory when given together, and both successively are necessary to the ovarian changes by which first heat and then pregnancy are induced. Weisner and Crew thus describe four sex hormones, already to some extent purified. Two from the ovary are directly responsible for the sex cycle; and two from the anterior lobe of the pituitary, are indirectly responsible for it, since they induce respectively the liberation of the two ovarian hormones.

If two ovarian hormones are accepted, and they in turn are dependent upon two others in the pituitary gland, the clinical application of ovarian hormones becomes much more complicated. With four hormones, drugs they may be called, all specifically concerned in the sex cycle, and the effects of their presence and absence in human beings still rather indefinitely understood, at present how can a physician confidently employ any specific ovarian therapy?

6. Evans, H. M.; and Simpson, M. E.: Antagonism of Growth and Sex Hormones of the Anterior Hypophysis. J. A. M. A., 91:1337, Nov., 1928.

7. Collip, J. B.: Ovary Stimulating Hormone of the Placenta. C. M. A. J., 22:215, Feb., 1930.

"The tendency of humanity to seek medical assistance in time of sickness or injury has been compared with the emotional element in religion, both being based upon 'a deep-lying instinct in human nature that relief from suffering is an obtainable goal,'" says Garrison.[8] From an instinctive faith that the relief of his patients' woes is possible, the physician continually tries new remedies. In dealing with internal secretions of high potency, his first care should be that at least his therapy does no harm.

QUANTITATIVE EFFECTS OF THYROID EXTRACT

Hypoinsulinism, hypothyroidism and hypoparathyroidism are more easily treated than the hyperfunctions, if the diagnosis can be made, since the hypofunctions usually respond to drugs given by mouth. The more radical intravenous injections or operative measures are not required. The hypo-conditions, therefore, invite early treatment. Hypothyroidism has in recent clinical literature received some attention, and reports of improvement of mild disorders following thyroid therapy have appeared. Thyroid extract has also been tried in a number of more serious conditions.

Epstein,[1] in 1912, suggested that impairment of thyroid function plays an important role in chronic nephrosis, a degeneration of the epithelial lining of the kidney tubules. Wolbach and Blackfan[2] found anatomical changes in the thyroid in eight children with chronic nephrosis. The basal metabolism is lowered in about 60 per cent of the cases, and there is an increase in the concentration of fats and lipoids in the blood plasma, a lipemia. There is said to be a reciprocal relationship between the blood cholesterol and the degree of thyroid activity, the cholesterol rising as the metabolic rate falls.

It is of interest that patients with chronic nephrosis have a remarkable tolerance for thyroid, and huge doses may be administered intravenously over long periods of time with few or no toxic symptoms and little elevation of

8. Garrison, F. H.: History of Medicine. Third Ed., p. 44. W. B. Saunders Co., 1922.

1. Fishberg, A. M.: Hypertension and Nephritis. Lea and Febiger, Philadelphia, 1930.

2. Wolbach and Blackfan: J. A. M. A., 92:2134, 1929. Quoted by 1.

basal metabolism. The thyroid extract sometimes induces diuresis in edematous nephrotics, with reduction of the edema. The thyroid ingested by nephrotic patients is not quickly excreted by the kidney, according to Plate.[3] It is probably either rapidly destroyed in the body or its action is by some means inhibited.

Thyroid tolerance varies in normal individuals, and dosage in general in mild cases of hypothyroidism is not well worked out. The effects of a small dose may be exactly opposite to those of a larger dose. Hutt[4] fed an increasing quantity of thyroid extract to normal black minorca pullets and cockerels on a well balanced ration. The largest doses used, 4 mg. of thyroid iodine to chickens of 1000 to 2000 grams weight, proved lethal. There was a rapid decline in weight of the fowls and they had intense thirst and diarrhea, followed by loss of appetite, dullness, and lack of coordination. At autopsy, the ureters of all were congested with urates, suggesting that thyroid extract increases the excretion of uric acid. The females went into a precipitate molt.

New feathers in all the thyroid fed birds were dull and rough, due to partial atrophy of the uropygial gland following thyroid feeding, and one week after the feeding was begun, new feathers of the males were "henny" or white. Even small doses of thyroid caused the development of hen feathering in the male birds, though it was most marked after large doses. Still smaller doses than were used in Hutt's experiments, according to other authorities, increase rather than decrease pigment production.

One naturally is led by this work to speculate upon the effect of the quantity of thyroid secretion upon the skin, hair, and eye color of normal individuals.

Those using thyroid therapy in human beings should check the patient's condition frequently with basal metabolism determinations. Careful records of the patient's appearance, skin, pulse, and weight should always be made, and simultaneous determinations of the blood cholesterol would be of value.

3. Plate, Robert: An Inquiry Into the Fate of Thyroxin in the Treatment of Nephrosis. Quart. Jour. Med., Oxford, 23:129, Oct., 1929.

4. Hutt, F. B.: A Note on the Effects of Different Doses of Thyroid on the Fowl. Jour. Exper. Biol. (British), 7:1, Jan., 1930.

Correspondence

WHERE DO WE GO FROM HERE?—A CORRECTION

Editor, SOUTHERN MEDICAL ASSOCIATION:

My attention has been called by Dr. Martin C. Hawkins, Jr., of Little Rock, Arkansas, to a misstatement by me of a fact concerning alleged recent legislation in the Arkansas Assembly regarding practising and office holding by osteopaths in Arkansas hospitals. The statement was in my paper entitled "Where Do We Go From Here?" read in the Section on Railway Surgery of the Southern Medical Association at the meeting in Miami last November and appeared in the SOUTHERN MEDICAL JOURNAL of February, 1930, page 164, as follows:

"Attempts were made in six states to put through bills proposing that all public institutions and hospitals supported wholly or in part by public revenue, or exempted from taxation, should accord equal privileges to practitioners of all forms of the healing art. *Arkansas actually did open up such institutions both as to practice and office holding in them to osteopaths.*"

Dr. Hawkins writes as follows:

"With reference to medical legislation in Arkansas, I have obtained information from the osteopath who attempted to introduce such a bill as you mentioned in your paper, to the effect that the bill was never introduced. This was confirmed further by the Secretary of the Arkansas State Medical Society and by a leading member of the Arkansas Medical Society who was a member of the past Arkansas legislature and who served in the capacity of speaker of the house."

The author, having obtained this information from a source considered reliable and trustworthy, is more than glad to correct his error and compliment Arkansas, with apologies for his mistake.

Respectfully,
J. W. SIMMONS, M. D.

Brunswick, Georgia, July 15, 1930.

Louisville—Where We Meet

ABRAHAM LINCOLN'S BIRTHPLACE MY OLD KENTUCKY HOME*

Romance, adventure, tradition and scenic beauty are some of the qualities which enter into the lure of Kentucky. And nowhere in the Bluegrass State are those things more readily found than in a section accessible to Louisville. A loop trip from the convention city covering approximately a hundred and twenty miles on the best of paved road takes the visitor to such places as the birthplace of Abraham Lincoln; "My Old Kentucky Home," where Stephen Collins Foster wrote many of his melodies of the Southland; St. Joseph's Cathedral, where there is housed a million dollar art collection, the gift of King Louis Phillipe of France;

*Prepared by the Louisville Convention and Publicity League, Harry G. Evans, Secretary and Managing Director.

the tomb of John Fitch, inventor of the steamboat, and other points of like interest.

Traveling to the Lincoln birthplace on the Dixie Highway, the visitor passes through Camp Knox, a permanent artillery training post, which during the World War formed with Camp Taylor, on the outskirts of Louisville, the two training cantonments where thousands of the youth of this section received their army schooling. Then on through Elizabethtown, a quaint little Kentucky town in which the antique furniture enthusiast will revel. This town is said actually to contain more famous old furniture in proportion to its population than any other place in America. The Brown-Pusey Community House in Elizabethtown is usually visited by persons passing through because of its wealth of historic and classic pieces of furniture.

Continuing through rich rolling Kentucky country, and skirting the edge of the cave regions, the monotony of steady automobile or bus travel broken by delightful scenic vistas and passing through little towns of individual stamp, finally Hodgenville, just three miles from the Lincoln memorial, is reached. At Hodgenville, the county seat of LaRue County, the court house holds many records of the Lincoln family. Marriage licenses, deeds, legal documents of various descriptions delight the hearts of persons interested in historic lore.

Traveling on a highway, like any other Kentucky road, the visitor reaches a farm entrance, seemingly like the other farm entrances which have been passed. Then, there is a turn in the lane and the majestic, yet simple, granite memorial building in which the Lincoln log cabin is preserved comes into view. It stands on a knoll approached by a succession of broad stone steps, the width of the memorial building itself, and presents usually an imposing contrast of a delicately balanced architectural creation in vivid white against the blue of a Kentucky sky. A feeling of awe sweeps over the visitor when it is realized that here in this isolated country spot there was born a boy who lived the simple life of a pioneer farmer and grew to a stature of spirit reached probably only by Washington. At the foot of the steps leading to the building and a little to one side a glimpse of a spring sunken in a depression of the earth is caught and on closer inspection it proves to have a lively flow of water. It is the very spring where the boy Lincoln drank.

Log cabin in which Abraham Lincoln was born. It is preserved in a memorial at Hodgenville on the original site.

On the facade of the memorial, as the visitor climbs the steps, the words are made out, taken from the lips of Lincoln himself,

"With malice toward none, with charity for all. . . ."

It brings a reverential feeling, which heightens, if possible, as the visitor steps inside and views the pathetic hovel, made of log piled upon log, which served as the shelter for the melancholy figure who reached divine heights.

After viewing the Lincoln farm, the many places connected with the traditions of Lincoln's boyhood, and maybe partaking of a genuine old-fashioned Kentucky country dinner at Hodgenville, the trip continues on to Bardstown. Here is the real scenic treat of the excursion. Towering hills which would be called mountains anywhere else range high on either side, presenting a vivid spectacle of nature reveling in a lavish display of its charms. A deep gorge, a silvery thread-like stream at its bottom, huge overhanging boulders, pleasant valleys in the distance; such are the things which will appeal on the journey from Hodgenville to Bardstown.

Just before Bardstown is reached the visitor will pass through a section of country bringing memories of a once famous Kentucky product. Gaunt, black skeletons will stare from hillsides, deserted buildings, once busy sources of mellow Kentucky Bourbon, now thrown into disuse by the spirit of the times, but still retaining an air of aristocracy as befits these places from which emanated the best liquor ever made. In Bardstown, old, yet a thriving little place full of associations with famed traditions, there is an old inn, still used as a hotel, and incidentally a very comfortable one, too, where King Louis Phillipe of France once stayed, not to mention the giant figures of American history who have passed nights within its walls.

Probably the most famous place at Bardstown is "My Old Kentucky Home," a typical house of ante-bellum days, the home in which Stephen Collins Foster wrote most of his songs of the Southland. It is preserved just as it was in the days before the Civil War. It is now a State Shrine and is to be preserved for posterity just as it is today. An idea of the charm and appeal it must hold is gleaned from the fact that in recent years it has been exceeded only by Washington's home at Mount Vernon in the number of visitors attracted.

Federal Hill, the name of the Old Rowan homestead where Foster wrote his immortal masterpiece, "My Old Kentucky Home," is reached by traveling over a narrow winding road that leads off the main street at Bardstown; and the hand of man and the touch of time have dealt gently with both it and the surrounding countryside.

"My Old Kentucky Home" was completed in 1795, work having been begun on it in 1789, and it has, among other distinctions, that of being one of the oldest houses in Kentucky. Its owner was Judge John Rowan, one of the first residents of Kentucky, and it was built by him to be used as a summer home and game lodge for the entertainment of distinguished visitors to Louisville. In those days, of course, there were no railroads or macadam highways, and the existing roads, hardly worthy of the name, were miserable; in dry weather, rough and bumpy; in wet weather,

a mere mass of sticky mud between the ruts worn by the wheels of carriages and wagons and well-nigh untraversable. All in all, it took about two and a quarter days to make the trip from Louisville to Bardstown, a journey that can be made nowadays in about an hour and a half by train or auto. In those days, Louisville and Bardstown were about the same size and it was thought, as at various times has been freely predicted for other cities in Kentucky, that some day the latter would be the metropolis of the state.

It must have been a rare thrill for the blase Easterner or Englishman or Continental to hunt deer and rabbits and other game on the estate of Judge Rowan, the thrill not being supplied by the pugnaciousness of the wild life especially, but rather by the Indians, probably devitalized Cherokees, who acted in the capacity of guides, for there was always a chance, never very remote, that the redskins might revert to type and the hunters become the hunted.

"My Old Kentucky Home," as Judge Rowan built it, is a reproduction of Independence Hall, at Philadelphia. Judge Rowan was one of the first settlers in Kentucky and was later one of the founders of the State. He held at different times the offices of Secretary of State and Judge of the Court of Appeals, and was also United States Senator from Kentucky. His son, John Rowan, Jr., was related to Stephen Collins Foster, hence Foster's visit to the home. The younger Rowan was at one time United States Minister to Italy during the administration of President James J. Polk.

During the 133 years of its existence "Federal Hill" has been, until its acquisition by the State a few years ago, solely in the hands of the Rowans, only three generations in all. Judge Rowan was very patriotic, as is evidenced in many little incidents. The name of the estate, "Federal Hill," runs back, of course, to Revolutionary War days, and is not, as many have supposed, indicative of the sympathies of the family during the Civil War. Indeed, quite the contrary. Every flight of stairs in the home consists of thirteen steps, no mere flaunting of superstition, but symbolic of the original thirteen states of the United States of America. In the center of the main hall downstairs is an arch and in the middle of this is a keystone representing Pennsylvania, the keystone state and the state of Judge Rowan's birth. (In the old wood cuts, the thirteen states were represented in the form of an arch with Pennsylvania occupying the position of the keystone. Hence its nickname.) The home proper contains, besides the two large halls, upstairs and down, six large rooms, each twenty-two feet by twenty-two feet, all high ceilinged. One explanation of the extremely high ceilings is that the rooms were built thus so that practice with the broad sword might be freely indulged in.

No additional furniture has been added to the Home since its creation into a shrine, a fact that immediately makes it unique among historical shrines, and every piece of furniture it contains was brought in by Judge Rowan. And, to grow lyrical, such furniture! The house is a veritable antique shop, with the decided difference that every item it contains is a genuine antique. Sofas by Heppelwaite, chairs by Chippendale, tables by Sheraton, various pieces by Duncan-Phyfe, all are present. Colonel La Bree told us that the ecstasy of many women on beholding these marvelous and beautiful examples of the cabinet-makers' art is truly astounding. "Ohs" and "ahs" rent the air and perhaps it is just as well that an inoffensive rope protects the rooms from yearning hands. Men, being made of sterner stuff, are probably just as appreciative, we believe, but hide their emotions better. Most of these pieces are from one hundred and sixty-five to over three hundred years old, and it is interesting to reflect that the creation of some of them was contemporaneous with the settlement of Jamestown. The furnishings of the Home on which atmospherical conditions and ordinary usage would have been a destructive effect, such as rugs, curtains and draperies, are, of course, not the original ones, but they are faithful reproductions.

One of the bedrooms in "My Old Kentucky Home." The furniture pictured is the same as it was when Stephen Collins Foster dwelt there.

Breathe the word Ambler to an antique dealer and he will sigh reverently. Whisper in his ear that you know where there is a piano made by that master of the vintage of 1830 with mother-of-pearl keys, and he will clutch your arm in ecstasy. But imagine his disappointment when you tell him that this particu-

lar one is not for sale and is in fact reposing in the parlor of "My Old Kentucky Home." It was on this piano that Foster probably played many of his completed pieces, all his actual composing being done with the aid of a small flute. Prolonging our exploration into the private lives of the various items of furniture, we come to a bed in one of the downstairs bedrooms in which eight presidents have slept, chronologically, as it were, of course, and not simultaneously. These eight were William Henry Harrison, Zachary Taylor, Andrew Jackson, James K. Polk, James Monroe, John Buchanan, Abraham Lincoln and Jefferson Davis, president of the Confederacy. The foregoing gives some idea of the distinguished visitors to the Home in days gone by, but at this time it constitutes only a very small per cent. Especially worthy of mention in this regard are the Marquis Lafayette and the young Prince Louis Phillipe, later King of France. Further detailing of the rare objects at "My Old Kentucky Home" would probably be tiresome in print to any save the zealot in such matters, but we wish to state that the originals are far from deserving that adjective and have to be seen to be appreciated.

The house itself is situated on a tract of 235 acres, all of which is a part of the shrine, and has been a part of Federal Hill since the day when the first Judge Rowan held his house-warming. The exterior of "My Old Kentucky Home" is of brick and, like the interior, is just as it was when it was first built, with the exception that the roof is a new one. This was necessitated by a violent gale that hit the home a few years ago and completely demolished its top. Indeed, if in the old days they had not built sturdily and well, the whole place would have been destroyed.

"My Old Kentucky Home" is situated at the top of a gently rising stretch of land and is surrounded by shade trees of great age, large and numerous. Two-thirds of the estate is covered by rare old red cedar woods, the remainder consisting of meadow and lawn. Also on the place is the old Rowan burying ground some hundred yards from the house and slave quarters of the pre-Civil War days, at some little distance from the house itself. Incidentally, both of these are closely woven in with Foster's songs; the death of John Rowan, Jr., is supposed to have been the inspiration for "Massa's in de Cold, Cold Ground" and the line in "My Old Kentucky Home"—"The young folks roll on the little cabin floor"—referred to the slave quarters.

People are prone to regard Stephen Collins Foster as the composer of only one song. It is needful, therefore, to call attention to the fact that he composed a total of 164 songs, among which are several almost as famous as "My Old Kentucky Home," namely: "Massa's in de Cold, Cold Ground," "Old Black Joe," "Old Dog Tray," "Uncle Ned," "Come Where My Love Lies Dreaming" and "Old Folks at Home" (S'wanee River).

In the heart of Bardstown stands St. Joseph's Church, once dignified by the title of Cathedral, and incidentally it lacks only size to make it compare most favorably with the architectural creations known by that name. Within the church is the real treasure, though. On its walls are the paintings of old masters, valued at over a million dollars, and in addition to their value as artistic wonders they possess the additional rarity of a romantic history.

When Louis Phillipe was exiled from his native France he fled for safety to America. Tradition has it that through various and devious channels he finally arrived at this little Kentucky town where Father Flaget, later made a Bishop, befriended him. Years after, when Louis Phillipe returned triumphant to France to become its King, he remembered his Kentucky friends and presented to the church these paintings.

The collection includes "The Flaying of Saint Bartholomew" by Reubens, "The Crowning of the Blessed Virgin" by Murillo, "The Winged St. Mark," "St. John the Baptist" and "St. Peter in Chains" by Van Dyck, and "The Crucifixion" by Van Bree. Three other paintings are not identified positively, but two are usually credited to Van Eyck with one unknown. The church has actually been offered $700,000 for the collection, but they are not for sale.

Other treasures possessed by the church are vestments and religious apparel, the handiwork of the Queen of France and her ladies. They are all to be seen, as are a number of gold vessels and other accoutrements bearing the Royal French Coat of Arms.

John Fitch, the steamboat inventor, lived and died at Bardstown. True, Robert Fulton is usually recognized as the inventor, but it was John Fitch's tragedy that he should solve the problem of steamboat navigation but not find the financial backing to put it across. In 1787, some few years before Fulton tried out his invention, Fitch built a paddle boat which worked. But success passed him by and tradition has it that he died by his own hand, a broken and disappointed man. His grave at Bardstown has a modest marker and is visited annually by many who pay a belated tribute to tragic genius.

But space does not permit the detailing of the many interesting points to be visited and the pleasures to be enjoyed. Suffice it to say that tradition has filled the entire country hereabouts with romantic and adventurous episodes in history. It is part of the lure of Kentucky, and will not be the least among the things to be enjoyed in connection with the Convention.

Book Reviews

Surgical Diagnosis. Volume III and Separate Index Volume, completing the new work by 42 American Authors. Edited by Evarts Ambrose Graham, M.D., Professor of Surgery, Washington University Medical School. Three Octavo volumes, totalling 2750 pages, containing 1250 illustrations, and Separate Index Volume. Philadelphia and London: W. B. Saunders Company, 1930. Cloth, $35.00 a set.

The ever widening scope of surgical therapy with the spread of surgery to well nigh every village in the land, makes a work of this kind on diagnosis very opportune. In the three volumes of this work, one will find every aid to diagnosis.

The contributors include many well known in surgical literature, occupants of famous chairs of surgery, and those who are engaged more exclusively in private practice.

Surgical diseases in this work are classified upon an anatomical basis with sections devoted to such general themes as wounds, infections, and post-operative complications.

In the study of a diseased individual, it is more important to make a physiological analysis of his condition than merely to assign a name to his disease, as

Barney Brooks points out in his chapter on "Diseases of the Blood Vessels." It is from this point of view that the work has evidently been planned. The debt that the clinician owes to pre-clinical science in diagnosis and in prognosis is made apparent on every page. While treatment is not purposefully included in the scope of the work, each disease is so covered etiologically and morphologically that rational therapy logically follows each discussion.

An account of research bearing on surgical problems is given, and adequate bibliographies follow each section.

The volumes are convenient in size, are easily read, the bindings are attractive and substantial, and the whole form is pleasing. The illustrations are numerous and well chosen and on the whole are sufficiently clear, save where x-ray films are reproduced. Each volume has its own index with a complete index for the whole work bound separately in a form very convenient for use.

The influence of the publication of this work will be equal to that of an educational institution in raising the standard of surgical practice among the medical profession.

Manual of Physical and Clinical Diagnosis. By Dr. Otto Seifert, late Professor of Medicine, Wuerzburg, and Dr. Friedrich Mueller, Professor of Medicine, II Med. Clinic, Munich. Authorized translation from the Twenty-fourth German Edition by E. Cowles Andres, M.D., Associate in Medicine, Johns Hopkins University. 543 pages with 140 illustrations and 3 colored inserts. Philadelphia and London: J. B. Lippincott Company, 1930.

There is embodied in this book a succinct and comprehensive presentation of that data which may be required at short notice either at the bedside or in the laboratory. History taking and physical examination are briefly covered. The chapters on laboratory methods are complete. Tests that the practitioner can do are given in detail. Others are condensed. The examination of the nervous system is completely described. The appendix includes tables for ready reference, such as maximal dosage of drugs, antidotes, and weights and measures. The fact that this book has gone through 24 German editions and has been translated into seven different languages attests its popularity. The student and interne will find it of great value.

The Mechanism of the Larynx. By V. E. Negus, M.S., London, F.R.C.S., England, Junior Surgeon for Diseases of the Throat and Nose, King's College Hospital, London. With an Introduction by Sir Arthur Keith, F.R.S. 528 pages, illustrated. St. Louis: C. V. Mosby Company, 1929. Cloth, $13.50.

This is an exhaustive monograph on the evolution, structure and functions of the larynx. It is the product, not only of much intensive study, but of many years of original research in the fields of comparative anatomy and physiology as well. As a prelude to an elaborate discussion of the human larynx, the author begins with the primitive organs of the lower forms of life, and traces the evolution and development of the larynx throughout the animal kingdom. The text is profusely illustrated with drawings, most of which are original. Nothing hitherto published on the subject approaches this volume in the comprehensiveness of its scope or the wealth of information it contains.

Surgery of the Lungs and Pleura. By H. Morriston Davies, M.A., M.D., M.Ch. (Cantab.), F.R.C.S. (England), Medical Superintendent, Vale of Clwyd Sanatorium; Consulting Surgeon to University College Hospital. 355 pages, illustrated. New York: Oxford University Press, 1930. Cloth, $8.00.

This volume is one of a series of monographs to be published by the Oxford Press, covering the whole of modern surgery. Each system of the body is to be treated by an authority, the whole being correlated by a general editor. The present volume covering diseases of the lungs and pleura appears in the usual attractive style of the Oxford Press. Its many beautiful illustrations are clearly reproduced on a high grade of book paper. The type is attractive and easy to read, and a helpful use has been made of foot notes. The anatomy and physiology of the thorax are covered in sufficient detail. The chapter on diagnosis is good, symptoms and signs being treated with proper emphasis. Modern knowledge of diseases of the pleura is well summarized. In this section, as throughout the whole volume, extensive use has been made of the work of American authors. In the treatment of empyema, little change has been made in the methods developed during the War.

The chapters on intra-pulmonary suppuration are good, the author very properly leaning toward conservatism. The surgery of pulmonary tuberculosis occupies a chapter of some sixty pages. The treatment recommended is based upon full pathological interpretation of the clinical state, and the various surgical procedures recommended are described in detail in the following chapters.

A full bibliography is given at the end of the volume and a carefully made index is provided.

The volume will undoubtedly prove of great use to the general surgeon, as well as to the specialist in this important field.

A Graphic Guide to Elementary Surgery. By Prof. Dr. Th. Naegeli, Bonn. Translated by J. Snowman, M.D., M.R.C.P., with introduction by Dr. C. Garre, Bonn. 205 pages with 322 illustrations. New York: William Wood & Co., 1929.

This little book is planned as a help for elementary students of surgery. Its value depends almost entirely upon rather crude drawings and charts which might be instructive to a beginner. There is certainly little or nothing in the scanty text of help to a mature student. Some of the drawings are suggestive and thought provoking, some rather amusing, but, on the whole, there seems little excuse for the book.

Minor Surgery. By Arthur E. Hertzler, M.D., Chief Surgeon, Halstead Hospital, and Victor E. Chesky, M.D., Chief Resident Surgeon, Halstead Hospital. Second Edition. 602 pages with 475 illustrations. St. Louis: The C. V. Mosby Company, 1930. Cloth, $10.00.

A standard work on minor surgery, this book gives methods of diagnosis and treatment which are used in the dispensary and lays stress on correct treatment of conditions in the minor stage to prevent more serious developments. Bandaging, sutures, dressings, hemorrhages, infections and some of the more important major surgical conditions are given. A number of new illustrations further enhance the value of this book.

Practical Local Anesthesia and Its Surgical Technic. By Robert Emmett Farr, M.D., F.A.C.S., Minneapolis, Minn. Second Edition, thoroughly revised. 611 pages, illustrated with 268 engravings and 16 plates. Philadelphia: Lea & Febiger, 1929.

The first section of this book covers the history of local anesthesia, its present status, and gives general notes on technic. The various local anesthetic agents are given with the advantages and disadvantages of each. The psychic problem of anesthesia is stressed. A complete description of the armamentarium is included, most of which has been devised by the writer. A motor driven machine for injection of the anesthetic agent is of special interest. It obviates the necessity of filling up numberless syringes and considerably speeds up the injection. Sacral, spinal, plexus blocks and the various methods of gaining anesthesia are brought up and their efficiency is rated. A complete, brief anatomy of the sensory nervous system comprises a chapter of this section.

In the second section detailed instruction is given for the use of local anesthesia in all parts of the body except the abdomen.

The third section covers abdominal anesthesia.

The author very carefully explains each step in the production of the anesthesia. The descriptions are clear cut and easily understood and the illustrations are in keeping with the high standard of the book. As long as the patient will cooperate the author feels that this type of anesthesia is most advantageous.

Novocaine is the agent of choice. Proper technic, gentleness in the handling of tissues, and a competent psycho-anesthetist will insure success.

Aids to the Mathematics of Pharmacy. By Arthur W. Lupton, M.C., Ph.C., Joint Principal, Leeds College of Pharmacy; One Time Member of Board of Examiners for England and Wales of the Pharmaceutical Society. 95 pages. New York: William Wood & Co., 1930. Cloth, $1.50.

This is a book designed to aid students who are reviewing for the examination in pharmacy. Various calculations, both general and volumetric, are given and explained.

Aids to Orthopaedic Surgery. By Eric A. Crook, M.Ch. (Oxon.), F.R.C.S. (Eng.), Assistant Surgeon, Charing Cross Hospital; Surgeon, Queen's Hospital for Children, London. 232 pages. New York: William Wood & Company, 1929. Cloth, $1.50.

A small book especially designed for the student. A short synopsis of the diagnosis and treatment of the commoner orthopedic conditions is given. The discussion is general, but brief. It is a handy book for quick review.

Practical Chiropody. By E. G. V. Runting, F.I.S.Ch., A Founder and the First President of the Incorporated Society of Chiropodists. Third Edition. 200 pages. St. Louis: The C. V. Mosby Company, 1929. Cloth, $3.00.

In this book are given full details for the diagnosis and treatment of the commoner affections of the foot. It is written with a scientific spirit and true professional dignity. It will prove helpful to the general practitioner, who is at times called upon to treat these conditions.

Proctology. By Frank C. Yeomans, A.B., M.D., F.A.C.S., Professor of Proctology, New York Polyclinic Medical School; Fellow and Past President, American Proctologic Society; Attending Surgeon, New York Polyclinic Hospital, and New York City Cancer Institute; Proctologist, The New York Hospital. Cloth $12.00. 661 pages, with 4 plates and 417 illustrations. New York and London: D. Appleton and Company, 1929.

This book is welcomed as an attempt to bring together in a single volume the present available knowledge of proctology. It gives to the medical profession an accurate, well planned and systematic work on a subject about which many popular misconceptions are current. Theoretical discussion has been largely subordinated to the prime purpose of producing a practical work. To this end illustrations are used freely. A frontispiece in colors, setting out proctoscopic views of pathologic rectosigmoidal mucosa, makes it a helpful addition to any reference library. The author has drawn from experience of twenty-six years in clinical and private practice in this specialty. A carefully compiled bibliography is appended. The book is highly recommended to those desiring a concise and authoritative exposition of proctology.

Surgical Diseases of the Thyroid Gland. By E. M. Eberts, M.D., Surgeon to the Montreal General Hospital; Associate Professor of Surgery, McGill University. With the assistance of R. R. Fitzgerald, M.D., and Philip G. Silver, M.D. 238 pages, illustrated with 48 engravings. Philadelphia: Lea and Febiger, 1929.

In this timely volume, little effort has been made to discuss at length unsolved problems in etiology, in pathology or in toxicity in diseases of the thyroid gland. A short account is given rather of what is generally known of the development, the structure and the function of the gland, followed by a more complete description of the clinical aspects of goiter.

The author does not accept completely the role of iodine in the causation of endemic and adenomatous goiter, but leans toward the toxic infective theory as explaining at least in part the etiology of these diseases. He does advise the use of iodine in prophylaxis, and does not fear harmful effects from its use. Detailed directions are given for its administration and an account of goiter prevention in many parts of the world is included.

The distinction between exophthalmic goiter and toxic adenoma is perhaps too finely drawn, and it is stated that in a case of toxic adenoma, "Iodine may be administered without evident effect. In some cases its effect is rather to increase the nervous symptoms. Only in rare instances is it of definite benefit." Yet its use is advised in the preoperative preparation of patients with these goiters, because of the possibility of mixed pathological types.

While operative technic is not described in detail, useful points are emphasized. Catgut is used, and drainage is rarely advised.

The little volume presents in convenient form an outline of present knowledge of the physiology and pathology of the thyroid gland and suggests a perfectly rational plan of therapy in management of thyroid disease.

The Care of the Nose, Throat, and Ear. By W. Stuart-Low, F.R.C.S. Eng., Consulting Surgeon to the Central London Nose and Ear Hospital. Second Edition. 88 pages. London: Bailliere, Tindall and Cox, 7 and 8, Henrietta Street, Covent Garden, W. C. 2. New York: Oxford University Press.

This is a very simply written book intended for the laity and medical students. The author has added a chapter on the ear. The fundamentals of anatomy and physiology are stressed. Emphasis is laid on the protective mechanism of the upper respiratory tract. Cancer, asthma and catarrh are discussed. Rules for the prevention and relief of deafness are given. The simplicity of presentation makes the book valuable for general use.

A Shorter Surgery. A Practical Manual for Senior Students. By R. J. McNeill Love, M.B., M.S. (Lond.), F.R.C.S. (Eng.), Assistant Surgeon, Metropolitan Hospital; Hunterian Professor, Royal College of Surgeons; Late First Surgical Assistant, London Hospital. Second Edition. 371 pages, with 74 illustrations, including 31 plates. New York: William Wood & Co., 1930. Cloth, $5.00.

In this volume diagnosis, rather than technic is emphasized. Regional surgery is taken up with the addition of a chapter on tumors. While written for students, its greatest benefit would be for a review of the subject, as the text is too brief for teaching purposes.

Diabetes. Directions for Treatment by Insulin and Diet. By Benjamin F. Smith, M.D., Physician and Lecturer to St. Joseph's Infirmary, Hermann Hospital, Houston, Texas. 223 pages. New York: D. Appleton & Company, 1930. Cloth, $2.00.

A preliminary discussion of diabetes, insulin and its use, as well as instructions in regard to the daily urinalysis are given in the first few pages of the book. Two hundred and fifty diets of varying caloric values are listed, with tables of foods that might be substituted.

Aids to Dermatology and Venereal Disease. By Robert M. B. MacKenna, M.A., M.B., B.Ch. Camb., M.R.C.P. Lond., M.R.C.S. Eng., Hon. Assistant Dermatologist, Liverpool Cancer and Skin Hospital, London. 236 pages. New York: William Wood & Co., 1929. Cloth, $1.50.

A pocket treatise on dermatology. The diagnosis and care of the various skin diseases is given in synopsis form. It is useful either to review for examination or to revise one's knowledge quickly. The carelessly written title suggests a careless text.

Nursing in Emergencies. By Jacob K. Berman, A.B., M.D., F.A.C.S., Assistant in Surgery Indiana University School of Medicine. 160 pages, with 109 illustrations. St. Louis: The C. V. Mosby Company, 1929. Cloth, $2.25.

In addition to the usual first aid methods, there is a discussion of some emergency operations and treatment. Most of the illustrations are crude drawings and many are valueless in a book of this description. Diagnostic methods and treatment are described which require special training or equipment that the average nurse has not.

Obstetrics for Nurses. By Charles B. Reed, M.D., F.A.C.S., Professor of Obstetrics, Northwestern University Medical School, and Charlotte L. Gregory, R.N., B.S., M.D., Adjunct in Obstetrics at Wesley Memorial Hospital. Third Edition. 399 pages, with 144 illustrations, including 2 color plates. St. Louis: The C. V. Mosby Company, 1930. Cloth, 3.00.

The authors have achieved a well written book, containing the essentials of obstetrical nursing care. It is suitable for pupil nurses who are high school graduates.

Incompatibility in Prescriptions and How to Avoid It, to which is added a Dictionary of Incompatibilities. By Thomas Stephenson, D.Sc., Ph.C., F.R.S. Edin., F.C.S. New Edition, Revised and Enlarged. 61 pages. New York: Paul B. Hoeber, Inc., 1929. Cloth, $1.50.

Appearing originally as a pamphlet, a booklet was created to fill the demand. Part I takes up the general principles of incompatibility; while Part II is a dictionary of incompatibilities. It is a book for the prescription writer's desk.

Pediatrics. Edited by Isaac A. Abt, M.D., Professor of Pediatrics, Northwestern University Medical School, with the collaboration of Arthur F. Abt, M.D., Assistant in Pediatrics, Northwestern University Medical School. A volume of The Practical Medicine Series. 448 pages, illustrated. Chicago: The Year Book Publishers, 1930. Price of this volume, $2.25.

This book contains abstracts of the pediatric literature for the past year. The articles are well up to par, and cover the entire field.

Southern Medical News

ALABAMA

Work will soon begin on the new $700,000 Holy Name of Jesus Hospital at Gadsden. The building is to be a six-story structure of brick, cement and steel and is expected to be completed in ten months.

Deaths

Dr. James A. Hurst, Walnut Grove, aged 66, died July 6.

ARKANSAS

The Ninth Councilor District of the Arkansas Medical Society has elected Dr. W. H. Poynor, Harrison, President; Dr. W. L. Watkins, Alpena Pass, First Vice-President; Dr. J. R. Parker, Eureka Springs, Second Vice-President; Dr. J. H. Fowler, Harrison, Secretary-Treasurer.

The Akransas Tuberculosis Sanatorium, Booneville, has as its new superintendent Dr. Jesse D. Riley, formerly of El Paso, Texas.

Dr. C. R. Moon, Little Rock, has been named Assistant Surgeon General of the United Confederate Veterans by the National Commander at Oklahoma City.

Dr. F. L. Castleberry, formerly of Paragould, is now located at Jonesboro.

Dr. W. H. Miller, of Little Rock, was recently visited by his sister, Dr. Janet Miller, who is a medical missionary.

Dr. Robert Harris, Superintendent of the Pulaski County Hospital, recently attended the Phipps Clinic at Johns Hopkins University, Baltimore, Maryland.

DISTRICT OF COLUMBIA

The degree of Doctor of Laws has been conferred by Georgetown University on Dr. William Gerry Morgan,

(Continued on page 32)

Patient Types . . .

The Convalescent

DURING the period of convalescence, Petrolagar is prescribed with great success. It mixes thoroughly with bowel content, mechanically protecting the delicate membrane as does the natural mucus.

Petrolagar avoids any apprehension or anxiety as to bowel function during the days when the patient is slowly regaining strength.

Petrolagar is an emulsion of 65% (by volume) mineral oil with the indigestible emulsifying agent, agar-agar.

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Gentlemen:—Send me copy of "HABIT TIME" (of bowel movement) and specimens of Petrolagar.

Dr.....

Address.....

.....

(Continued from page 776)

Washington, and the degree of Doctor of Science has been conferred on him by Dartmouth College. Dr. Morgan is the member of the Council of the Southern Medical Association for the District of Columbia.

The newly elected officers of the Medical Society of the District of Columbia are Dr. William H. Hough, Washington, President; Dr. Coursen B. Conklin, Secretary, reelected. The next annual session will be held in Washington, May 6, 1931.

A National Institute of Health under the direction of the United States Public Health Service, which will absorb the old Hygienic Laboratory of the Public Health Service, was recently authorized by President Hoover. The bill carried with it an appropriation of $750,000 to be used for sites and buildings. The Surgeon General of the Public Health Service, Dr. Hugh S. Cumming, will be in charge of the new institute, and Dr. George W. McCoy, present Director of the Hygienic Laboratory, is expected to continue as Director.

Dr. Luther H. Reichelderfer, Washington, has been elected President of the Board of Commissioners of the District of Columbia.

The National Academy of Mexico recently made Surgeon General Hugh S. Cumming an honorary member.

Dr. Wallace M. Yater has assumed the Chair of Medicine in Georgetown University School of Medicine, Washington, succeeding the late Dr. Wilfred M. Barton.

Deaths

Dr. Mary Louise Strobel, Washington, aged 76, died April 23, of cerebral hemorrhage.

Dr. Elnora Cuddeback Folkmar, Washington, aged 67, died April 20, of cerebral hemorrhage.

Dr. Albert Joseph Carrico, Washington, aged 57, died April 19, at Johns Hopkins Hospital, Baltimore, Maryland.

Dr. Donald Brock Holloway, Washington, aged 57, died in May at Shawnee, Oklahoma, of perforated duodenal ulcer and uremia.

Dr. Linnaeus S. Savage, Washington, aged 58, died May 4 of chronic myocarditis.

FLORIDA

Dr. Henry Hanson, State Health Officer, and Dr. Noble A. Upchurch, City Health Officer of Jacksonville, were recently honored by being named Fellows of the American Public Health Association.

The Woman's Auxiliary to the Marion County Medical Society was recently organized in Ocala, with the assistance of the State Hygeia Chairman, Mrs. Hermann H. Harris, of Jacksonville. Mrs. H. C. Dozier, Ocala, was elected President; Mrs. A. H. Freeman, Ocala, Vice-President; Mrs. T. H. Wallis, Ocala, Secretary; and Mrs. W. B. Clark, Ocala, Treasurer.

Dr. S. G. Hollingsworth, of Bradenton, was recently appointed by the Governor a member of the State Board of Medical Examiners.

Weems Hospital at Sebring is now equipped with an x-ray.

Dr. Herbert L. Bryans and Dr. J. M. Hoffman, of Pensacola, are now associated in practice.

Dr. Lewis W. Glatzau, of Deland, sailed on June 14 for Vienna, Austria, where he will attend the University of Vienna for a year, doing post-graduate work in eye, ear, nose and throat.

Dr. A. H. Freeman, of Ocala, will have associated with him Dr. William B. Clark, formerly of Atlanta, Georgia.

Deaths

Dr. Thomas Julian Cleland, Tampa, aged 61, died February 4.

Dr. John Roy Hawkins, Miami, aged 43, died March 13.

Dr. Zane Hughes, Miami, aged 63, died April 13, of injuries received in an automobile accident which occurred in January.

Dr. Samuel David Miller, South Jacksonville, aged 59, died April 2, of heart disease.

(Continued on page 34)

Calcium Deficiency in Infants

"A baby fed on pasteurized milk over a long period receives too little calcium for his growth requirements." (A. L. Daniels & G. Stearns, Journal of Biological Chemistry, Aug. 1924).

Kalak Water is rich in available calcium and can be employed as a drinking water for infants or incorporated in feeding formulas.

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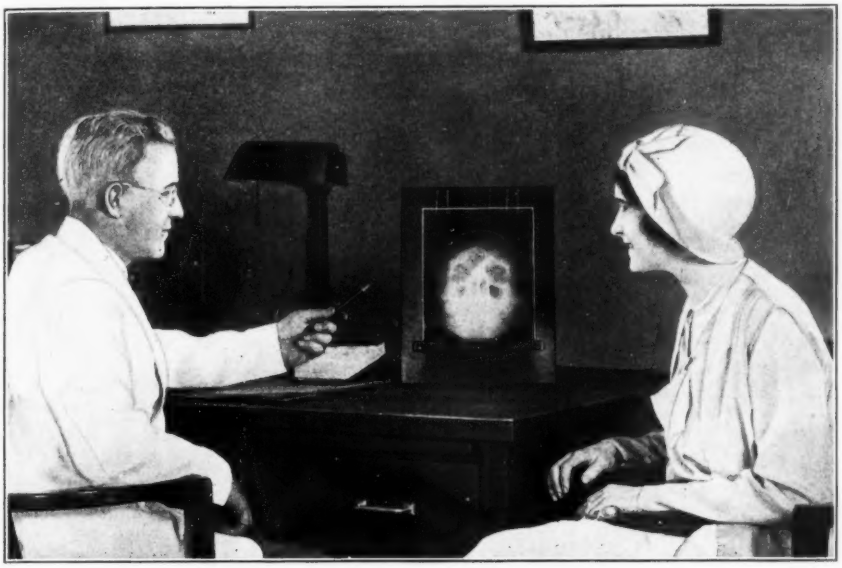

"I Was a Little Anxious at First But There is Nothing to Worry About"

A CASE presenting that "questionable quantity" is annoying to you and it causes the patient needless worry. It is under these circumstances that x-rays are of first importance—they reveal information of basic value in correct diagnosis.

When you point to a radiograph which is authentic, sparkling, full of detail and contrast, and say, "I can definitely see that there is nothing to worry about," you create a mental state which is a priceless adjunct to your scientific treatment.

Wherever there is a slightly debatable point, x-rays should be employed for your protection and the patient's benefit. And be sure the film used is EASTMAN DUPLI-TIZED, CONTRAST—THE ACCEPTED RADIOGRAPHIC MEDIUM THE WORLD OVER.

Eastman Kodak Company, *Medical Division*
347 State Street, Rochester, N. Y.

Gentlemen:

Please send me your new booklet on radiography, "X-rays in Medicine," which I understand is free.

Name .....

Street and Number .....

City and State .....

(Continued from page 32)

GEORGIA

Georgia Medical Society has elected Dr. Lee Howard, Savannah, President; Dr. T. P. Waring, Savannah, President-Elect; Dr. A. A. Morrison, Savannah, Vice-President; Dr. H. H. McGee, Savannah, Secretary-Treasurer.

Jefferson County Medical Society has elected Dr. J. J. Pilcher, Wrens, President; Dr. J. O. Kelley, Avera, Vice-President; Dr. S. T. R. Revell, Louisville, Secretary-Treasurer.

Jenkins County Medical Society has elected Dr. M. E. Perkins, Millen, President; Dr. H. G. Lee, Millen, Vice-President; Dr. C. Thompson, Millen, Secretary-Treasurer.

Macon County Medical Society has elected Dr. G. W. Nelson, Marshallville, President; Dr. H. C. Derrick, Oglethorpe, Secretary-Treasurer.

Muscogee County Medical Society has elected Dr. C. A. Dexter, Columbus, President; Dr. F. B. Blackmar, Columbus, Vice-President; Dr. H. J. Bickerstaff, Columbus, Secretary-Treasurer.

Montgomery County Medical Society has elected Dr. W. M. Moses, Uvalda; Dr. H. C. Sharpe, Alston, Vice-President; Dr. J. E. Hunt, Mount Vernon, Secretary-Treasurer.

Screven County Medical Society has elected Dr. H. W. Doster, Rocky Ford, President; Dr. A. B. Reddick, Sylvania, Vice-President; Dr. L. F. Lanier, Sylvania, Secretary-Treasurer.

Washington County Medical Society has elected Dr. F. B. Rawlings, Sandersville, President; Dr. N. J. Jewsom, Sandersville, Vice-President; Dr. W. M. Cason, Sandersville, Secretary-Treasurer.

The new officers of the Georgia Urological Association are Dr. W. L. Champion, Atlanta, President; Dr. W. F. Reavis, Waycross, Vice-President; Dr. Allen F. Caldwell, Atlanta, Secretary-Treasurer. Members of the Executive Committee are Dr. E. G. Ballenger, Atlanta, Dr. Ernest Corn, Macon, and Dr. W. A. Upchurch, Atlanta.

The Eye, Ear, Nose and Throat Club of Georgia elected Dr. William L. McDougall, Atlanta, President, and Dr. William O. Martin, Atlanta, Secretary-Treasurer.

The Stephens County Medical Society presented Dr. C. L. Ayers, Toccoa, its Secretary-Treasurer, with a fountain pen for his faithful service.

Dr. Henry R. Slack, LaGrange, represented the Medical Association of Georgia for the fourth consecutive time as a delegate in the Pharmacopeial Convention held in Washington recently.

Dr. Noah Baird, Atlanta, has been elected as a member of the Board of Education to succeed Dr. M. M. Burns, whose term had expired.

Dr. and Mrs. Dunbar Roy, Atlanta, recently sailed to spend four months abroad.

Dr. B. McH. Cline, Atlanta, spent several months in Philadelphia at Dr. Jackson's Bronchoscopic Clinic.

The Alumni Society of the University of Georgia elected Dr. Phinizy Calhoun, of Atlanta, President, succeeding Dr. Craig Barrow, of Savannah.

Dr. Boise S. Bomar, Atlanta, and Mrs. Walter W. Lowe were married in May.

Deaths

Dr. William Ira Butler, Unadilla, aged 52, died May 12 of heart disease and nephritis.

Dr. James N. Christian, Alma, aged 57, died March 12 of pneumonia.

Dr. Reuben Benjamin Durret, Atlanta, aged 66, died May 24 in Buckhead of cerebral hemorrhage.

Dr. William Alexander Carlton, Athens, aged 84, died May 9.

Dr. Thomas J. Moss, Atlanta, aged 73, died April 28 of cerebral hemorrhage.

Dr. Leroy Napier, Lumber City, aged 61, died May 5, of angina pectoris.

Dr. Elbert P. Rose, Valdosta, aged 68, died June 1.

KENTUCKY

Dr. Charles G. Lucas, Louisville, has been elected Secretary of the American Gastro-Enterological Association.

(Continued on page 36)

THE EVIDENCE WHICH SUPPORTS OUR CLAIMS

ACCEPTED AMERICAN MEDICAL ASSN

Simply ask for the complimentary package as advertised

BELIEVING THAT THERE IS NOTHING QUITE SO CONVINCING AS AN ACTUAL TEST WE WOULD LIKE TO SEND EVERY INTERESTED PHYSICIAN A COMPLIMENTARY PACKAGE AS FOLLOWS:

100 TABLETS CALCREOSE 4 GRAINS, A TUBE OF EPHEDRINE NASAL JELLY-MALTBIE
and complete information on these two popular prescription products

REMEMBER, Calcreose is not only a stimulant expectorant in bronchitis and of value in tuberculosis, but is also of value as a urinary antiseptic in frequent and burning urination and as an intestinal antiseptic in enteritis and similar disturbances.

Calcreose—calcium creosotate—is a mixture containing in loose chemical combination approximately equal weights of creosote and lime and provides a form of creosote which patients will tolerate.

Ephedrine Nasal Jelly-Maltbie is a preparation for local relief of "colds", hay fever and conditions involving congestion of the nasal passages. It contains ephedrine sulphate one per cent, menthol one-fourth of one per cent and sodium benzoate one-half of one per cent, in a special, bland base.

Supplied in plain collapsible tubes—no printing. Each tube comes in blank carton with removable wrapper. A special nasal tip attachment permits convenient administration.

MALTBIE CHEMICAL COMPANY, Newark, New Jersey

DRYCO

Requires no Refrigeration!!!

The hot days of August endanger the health of babies.

Fermentative Diarrhea-Summer complaint is caused by

Infected Milk and Hot Weather!

Babies cannot stand prolonged starvation caused by diarrhea and vomiting—an intolerance to the food supplied!

DRYCO is tolerated, digested and assimilated when other foods fail.

This milk, especially prepared for babies, is free from all pathogenic bacteria!

The protein is 97 per cent assimilable!

It contains the vitamins unimpaired!
DRYCO answers the need of thousands of physicians in every part of the world in their

Diarrheal and Difficult Feeding Cases!!

Prescribe Dryco . . . The Safe Milk

Send for samples and clinical data.
Pin this to your Rx blank or letterhead and mail.

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THE "PURITAN MAID TRADE MARK" IN ANESTHETIC GASES AND EQUIPMENT IS THE HALL MARK FOR PURITY OF PRODUCTS AND EFFICIENCY OF SERVICE.

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Physicians Office Furniture
INDIANAPOLIS

1131 Burdsal Pk'w'y. Indianapolis

(Continued from page 34)

Dr. Samuel E. Hainline, Owensboro, has tendered his resignation as Director of the Daviess County Board of Health, effective when his successor is appointed. Dr. Hainline will enter private practice at Owensboro.

The new officers of the Woman's Auxiliary of the Jefferson County Medical Society are Mrs. John K. Freeman, President; Mrs. L. W. Neblett, First Vice-President; Mrs. Geo. Leachman, Second Vice-President; Mrs. Walter Hume, Third Vice-President; Mrs. O. H. Kelsall, Fourth Vice-President; Mrs. M. C. Baker, Secretary; Mrs. C. G. Arnold, Treasurer; and Mrs. Philip Barbour, Parliamentarian, all of Louisville.

The Woman's Auxiliary of the Perry County Medical Society has elected Mrs. G. B. Wheeler, President; Mrs. R. L. Collins, First Vice-President; Mrs. G. M. Adams, Second Vice-President; Mrs. G. E. Bowles, Secretary-Treasurer, all of Hazard.

Deaths

Dr. Nestor Barnett, Caneyville, aged 73, died May 2 of heart disease.

Dr. Hiram Bailey, Adairville, aged 63, died May 5.

Dr. Verne Calvin Graber, Lexington, aged 37, died April 13 at Iowa City, Iowa.

Dr. Samuel J. Porter, Vale, aged 74, died April 4 at Ashland.

Dr. George Laughton Pope, Louisville, aged 75, died April 9, of carcinoma of the bladder.

Dr. Thomas Jefferson Slaton, Greenville, aged 86, died May 7.

Dr. Edward Schmiedeknecht, Jr., Louisville, aged 48, died May 10, of agranulocytosis.

Dr. Levy De Foe Whitaker, Greenville, aged 54, died May 10, of carcinoma of the thyroid gland.

Dr. Rufus R. Winston, Paducah, aged 72, died April 28 of chronic nephritis.

LOUISIANA

Under the direction of Dr. Ernest Carroll Faust, Professor of Parasitology at Tulane University, New Orleans, the New Orleans physicians and graduate students of medicine at Tulane will compose an expedition into Panama this summer for a three months' study of parasites in wild monkeys in relation to parasites in man. The Gorgas Memorial Institute in Panama is sponsoring the investigation.

During the Southern States Conference of the American Social Hygiene Association in New Orleans, a committee of twenty was organized for the purpose of making a survey of social hygiene conditions in New Orleans. Dr. H. W. E. Walther is Chairman of the Committee and Mr. Charles C. Shedd, Secretary.

The Louisiana State Pediatric Society has elected Dr. Robert A. Strong, New Orleans, President; Dr. R. T. Lucas, Shreveport, Vice-President; Dr. Suzanne Schaefer, New Orleans, Secretary-Treasurer; Dr. Emile Naef, Baton Rouge, Chairman of Scientific Committee.

Dr. O. W. Bethea, Professor of Therapeutics in the Graduate School of Medicine of the Tulane University of Louisiana, has been appointed a member of the Revision Committee of the next United States Pharmacopea.

Dr. Jules Myron Davidson, New Orleans, announces the removal of his office to the Pere Marquette Building.

The Woman's Auxiliary of the Louisiana State Medical Society has elected Mrs. A. A. Herold, Shreveport, President; Mrs. H. W. E. Walther, New Orleans, President-Elect; Mrs. S. C. Jamison, New Orleans, Vice-President; Mrs. J. L. Scales, Shreveport, Vice-President; Mrs. L. J. Williams, Vice-President; Mrs. J. A. White, Alexandria, Vice-President; Mrs. W. S. Kerlin, Shreveport, Treasurer; Mrs. R. B. Harrison, New Orleans, Recording Secretary; Mrs. R. G. Douglas, Shreveport, Corresponding Secretary.

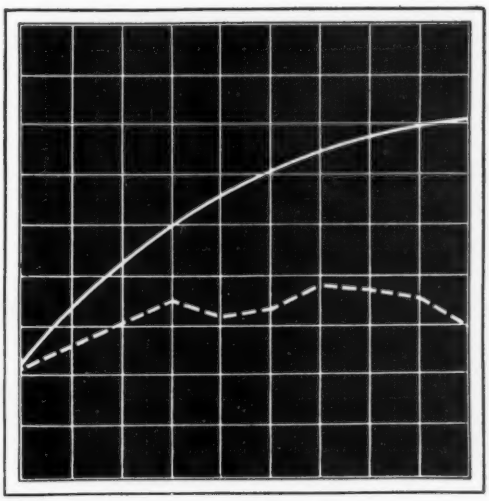
Deaths

Dr. Louis Abramson, Shreveport, aged 60, died in April of cerebral hemorrhage.

Dr. Julius Alexander Brock, Lafayette, aged 33, died March 24, in a hospital in New Orleans.

(Continued on page 38)

When the Weight Curve Falters . . .



Rx Merrell-Soule Powdered Whole Lactic Acid Milk

SATISFACTORY gains in marasmic and underweight infants may be promptly noted and usually continue without interruption when this superior form of Lactic Acid Milk is used. Its acidity permits of greater caloric intake, increases fat tolerance, accelerates digestion and improves the appetite. Upon ingestion, Lactic Acid Milk forms small, friable, readily digestible particles . . . a necessary factor in the establishment and maintenance of normal weight.

Absolutely stable, its acid content unfluctuating, Merrell-Soule Powdered Whole Lactic Acid Milk is simpler to prepare *accurately* than any other form of lactic acid milk. This insures the baby getting exactly what you prescribe and gives you more complete control in every case . . . an important consideration.

Samples and literature sent promptly on request.

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ACCEPTED AMERICAN MEDICAL ASSN. Committee on Foods

(Recognizing the importance of scientific control, all contact with the laity is predicated on the policy that Klim and its allied products be used in infant feeding only according to a physician's formula)

Merrell-Soule Powdered Milk Products, including Klim, Whole Lactic Acid Milk and Protein Milk, are packed to keep indefinitely. Trade packages need no expiration date.

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To be forewarned is to be forearmed.

With the hot weather infant enterocolitis may be expected and experience has amply demonstrated the value of lactic cultures in these cases.

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In Prenatal Care

For the good of both mother and child, a safe diet is needed which provides the elements for body building, especially for sound bone and tooth formation, without impoverishment of the mother's own organism. Essential also is the energy fuel needed to sustain the mother's strength and vitality.

For a food rich in vitamins and minerals . . . . .
For the vital building elements of whole milk, wheat and barley . . . . . .
For a delicious beverage, refreshing to the expectant mother . . . . . .

THE ORIGINAL MALTED MILK
HORLICK'S
Samples and literature sent upon request
Horlick's Malted Milk Corp. Racine, Wis.

(Continued from page 36)

MARYLAND

The Rockefeller Foundation has contributed to Johns Hopkins University $887,500 to be given over a period of ten years for the increased support of the biologic sciences, and $100,000 for research in the humanities.

The following changes in the faculty at Johns Hopkins have been made: Dr. L. Emmett Holt, Jr., from Associate in Pediatrics to Associate Professor of Pediatrics; Dr. John R. Oliver, Associate in History of Medicine; Dr. Fielding H. Garrison, now Librarian of the William H. Welch Medical Library, to Resident Lecturer in History of Medicine.

The Children's Hospital School, Baltimore, has received from Mrs. Thomas H. Bowles $230,000 for the erection of an addition. The new unit will be built as a memorial to Mr. Bowles, who died in 1923.

A memorial tablet to Dr. William Royal Stokes, Baltimore, who died in February from psittacosis contracted while dissecting infected parrots, will be erected in the foyer of the Municipal Building of Baltimore.

Johns Hopkins University received a gift from the General Education Board of $312,500 for the establishment of a Department of History of Medicine.

At the U. S. Quarantine Station at Curtis Bay a laboratory has been established for research on psittacosis, and to find methods of combating the disease, by Dr. Charles Armstrong, of the U. S. Public Health Service. Only those who have had the disease will be permitted to carry on the experiments.

Deaths

Dr. David Clark Owings, Middletown, aged 75, died May 9 of carcinoma of the stomach, with metastasis of the liver.

MISSISSIPPI

Dr. M. J. L. Hoye, who has been Superintendent of the East Mississippi State Hospital, Meridian, for twelve years, has been reappointed. This hospital will soon celebrate the opening of two modern fireproof buildings.

A Department of Pediatrics at Vicksburg Sanitarium was recently opened with Dr. Guy C. Jarratt, formerly from the Children's Memorial Hospital at Chicago, in charge.

Dr. E. W. Mackey, formerly of Purvis, is now located in Meridian, practice limited to diseases of the eye, ear, nose and throat.

The following appointments have been made by the Governor: Dr. R. H. Cranford, Superintendent of the South Mississippi Charity Hospital at Laurel; Dr. C. D. Mitchell, Superintendent of the Insane Hospital at Jackson (reappointed); Dr. Willis Walley, Superintendent of the Jackson Charity Hospital, Jackson; Dr. W. A. Dearman, Gulfport, Dr. W. H. Frizell, Brookhaven, and Dr. John Darrington, Yazoo City, members of the Mississippi State Board of Health.

Dr. Henry Boswell, Jr., Sanatorium, was elected President of the National Tuberculosis Association recently.

Dr. Farris J. Martin and Miss Myrtis Catharine Germany were married in Meridian May 10.

Deaths

Dr. John Frank Aycock, Calhoun City, aged 43, died May 17.

Dr. Robert B. Crisler, Flora, aged 54, died April 19 of cerebral hemorrhage.

Dr. John J. Prowell, West Point, aged 79, died April 21 of acute dilatation of the heart and chronic myocarditis.

MISSOURI

The Missouri State Medical Association has elected Dr. Wenzel C. Gayler, St. Louis, President; Dr. J. Frank Harrison, Mexico, President-Elect; Dr. E. J. Goodwin, St. Louis, Secretary, reelected; Dr. G. W. Hawkins, Salisbury, Treasurer, reelected. The 1931 annual meeting will be held at Joplin.

The Missouri Society of Medical Secretaries has elected Dr. C. D. Humbert, Barnard, President; Dr. Howard B. Goodrich, Hannibal, Vice-President; Dr. J. T. Hornback, Nevada, Secretary, reelected.

(Continued on page 40)

Results · · More Simply · · More Quickly

S. M. A. began a new chapter

IN 1921, S. M. A. began a new chapter in simplified feeding methods. It was a response to an appeal from all methods that were troublesome to the physician and difficult for the mother. It was a practical demonstration that a single, modified milk formula really resembling breast milk would give results and give them more simply and more quickly. True enough, S. M. A. is not a panacea, but since it resembles breast milk so closely in its essential, physical, chemical and metabolic properties, the fact remains that most infants do exceptionally well on it without any modification or change.

Avail yourself of your earliest opportunity to know S. M. A. by personal experience. Most physicians tell us that S.M.A. even surpasses their expectations. If you care to have samples, write us. Ask for our convenient, pocket, celluloid feeding table also.

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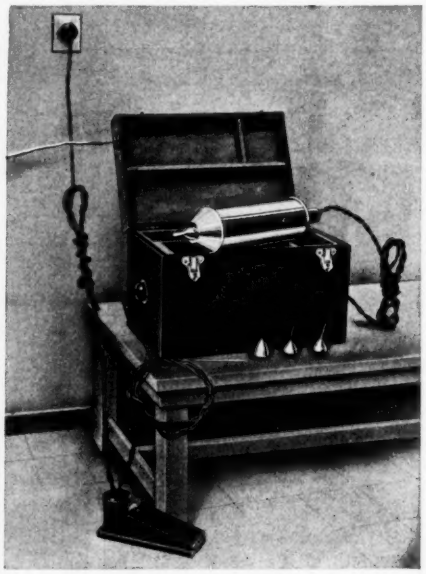
Only fresh milk from tuberculin tested cows, from dairy farms that have fulfilled the sanitary requirements of the City of Cleveland Board of Health, is used as a basis for the production of S. M. A.



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Dr. W. W. Sweet Magnet with Electronic Valve will operate on any 110-volt current

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This electronic valve is not new nor untried, but heretofore was too expensive to manufacture for commercial use. Our modern chemists, however, have reduced this cost. The action of this valve is of passing current through a copper oxide plate, which allows the current to flow only in one way. By a series of these plates we are enabled to control any voltage and give full wave rectification. The action is purely electronic, not electrolytic. There is nothing to wear out. It does not require any attention or renewals, any acid, or chemicals of any kind, there are no bulbs or moving parts, just a group of copper oxide plates that are bolted together and placed in the bottom of carrying case It weighs only three pounds more than the bare magnet

Can be used anywhere on any 110-volt current, either direct or alternating, any cycles.

Just plug into any lamp socket and it is ready.

Case has plug to fit the proper connections, so no errors can be made.

Nothing to think about,—just push plug into socket and it is ready for the operation.

Price complete outfit with all attachments:

110-volts $85.00

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BIRMINGHAM, ALA.

(Continued from page 38)

Grundy County Medical Society has elected Dr. T. E. Moore, Trenton, President; Dr. G. W. Belshe, Trenton, Vice-President; Dr. E. A. Duffy, Trenton, Secretary-Treasurer.

Saline County Medical Society has elected Dr. R. W. Kennedy, Marshall, President; Dr. Fred A. Stahl, First Vice-President; Dr. A. E. Gore, Marshall, Second Vice-President; Dr. R. C. Haynes, Marshall, Secretary-Treasurer.

St. Francois-Iron County Medical Society has elected Dr. E. F. Hoctor, Farmington, President, reelected; Dr. D. E. Smith, Bonne Terre, Vice-President; Dr. Ralf Hanks, Farmington, Secretary, reelected.

Dr. Charles Hugh Neilson, Associate Dean of St. Louis University School of Medicine and Professor of Internal Medicine, and Dr. Daniel Martin Schoemaker, Professor of Anatomy, were recently given an anniversary dinner honoring their twenty-five years of uninterrupted service in the school.

More than $40,000 has been subscribed toward the $50,000 that the Rolla Chamber of Commerce has been soliciting to build a hospital in Rolla to be known as the May Hyer Memorial Hospital. Wilks Hyer, head of the Penny Stores in St. Louis, will give $50,000 provided citizens of Rolla raise an equal amount.

Dr. D. D. Cox, formerly of Pomona, has moved to Rolla.

The 300th anniversary of the discovery of quinine will be celebrated by Shaw's Garden, St. Louis, October 31 and November 1. Several leading scientists from all over the world have been invited for the occasion by Dr. George T. Moore, Director of the Garden.

More than a year ago Dr. Malvern B. Clopton, St. Louis, gave $250,000 of the amount to be expended on the Rand-Johnson Memorial Wing of the Barnes Hospital. Announcement was not made of this gift until recently.

Dr. Lee W. Dean, St. Louis, has been elected Vice-President of the American Otological Society.

Dr. Max A. Goldstein, St. Louis, has been elected President of the American Laryngological, Rhinological and Otological Society.

Dr. George K. Lewis, St. Louis, and Miss Fern Drake, were married March 8.

Deaths

Dr. Butler Stewart Crossy, St. Louis, aged 57, died in May of chronic nephritis and heart disease.

Dr. Oscar Herman Elbrecht, St. Louis, aged 52, died May 5, in St. Luke's Hospital, of bronchopneumonia.

Dr. Thomas B. Herbert, Lebanon, aged 62, died May 4, of heart disease.

Dr. John H. McCaughan, St. Louis, aged 60, died May 2, of injuries received when he fell from a window.

Dr. Mary Hancock McLean, St. Louis, aged 69, died May 7, of chronic myocarditis and pyelonephritis.

Dr. John Wilson, Liberty, aged 91, died March 28, of cerebral hemorrhage and angina pectoris.

Dr. Delbert Lercy Wood, Kansas City, aged 68, died May 14, of chronic endocarditis.

NORTH CAROLINA

The Medical Society of the State of North Carolina has elected Dr. J. G. Murphy, Wilmington, President; Dr. M. L. Stevens, Asheville, President-Elect; Dr. C. A. Julian, Greensboro, and Dr. J. W. Davis, Statesville, Vice-Presidents; Dr. L. B. McBrayer, Southern Pines, Secretary-Treasurer, reelected. Durham was chosen for the 1931 meeting place.

Catawba Valley Medical Society has elected Dr. W. B. Cornwell, Lincolnton, President; Dr. L. Achard, Morganton, Vice-President; Dr. J. D. Rudisill, Lenoir, Secretary; and Dr. W. P. Richardson, Lenoir, Treasurer. The Society will meet again in September at Morganton.

The Sixth District Medical Society has elected Dr. W. N. Thomas, Oxford, President; Dr. C. E. Cheek, Fuquay Springs, Vice-President; Dr. B. W. Fassett, Durham, Secretary-Treasurer.

Dr. Robert C. Kesler, Spencer, has accepted a position at the United States Marine Hospital at New Orleans, Louisiana.

(Continued on page 42)

COURAGEOUS PIONEERS!

—were those Riders of the Mail, who, at the point of the arrow, galloped on—through calm and storm; over mountain and plain; through daylight and the pall of darkness, that the Mail might get through!

Often, along that lonesome trail a little heap of bones picked clean by vulture and coyote and paled under Western Suns, bespoke the supreme sacrifice of an intrepid Pioneer of the Pony Express to the Cause of the Mail!

It is not incredible that Mail Order, conceived in the desire to bring the great centers of Merchandising to the people, should have developed as a safe and sound means of transacting business, now of magnitudinous proportion!

There were those even in this latter day who belittled the Business Courage of Mail Order in Surgical Supplies. A steadfast belief in the soundness of the method and recognition of the needs of physicians in all parts of the country, coupled with faithfulness in the presentation of guaranteed merchandise, has rewarded its Pioneers! Growth of the House of Aloe to the largest of its kind in the World vindicated its progressive policy!

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℞ 5 to 15cc, by injection direct into the bladder.

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MANHATTAN EYE SALVE COMPANY

Louisville, Kentucky

(Continued from page 40)

Dr. Thurman D. Kitchin has been elected President of Wake Forest College at Wake Forest.

Dr. L. V. Grady, of Wilson, who has been Secretary and Treasurer of the North Carolina Hospital Association, was elected President recently, succeeding Dr. D. A. Garrison, of Gastonia. Dr. Edward Farmer, of Wilson, was elected Secretary and Treasurer.

The Tenth District Medical Society has elected Dr. Isaac J. Archer, Black Mountain, President.

Dr. C. G. Milham, who has been in charge of children's work at the North Carolina Tuberculosis Sanatorium, is now acting Superintendent of the Guilford County Sanatorium at Jamestown, pending recovery of Dr. J. L. Spruill, who is ill at the High Point Hospital.

Dr. J. R. Gamble, Lincolnton, who has been studying in New York, will open a clinic and hospital at Lincolnton.

Dr. Charles E. Cheek, Fuquay Springs, and Miss Eva Agnes Babcock, of Chase City, were married May 15.

Dr. Emma Katharine Baylis, Greensboro, and Mr. Charles Pattison MacInnis, of Binghamton, New York, were married April 22.

Deaths

Dr. C. S. Lawrence, Winston-Salem, aged 51, died June 21.

Dr. Samuel Nicholson, Washington, died May 23.

Dr. Richard Jordan Noble, Salem, aged 76, died April 27, of pneumonia, following injuries received in an automobile accident.

Dr. John Albert Patterson, Concord, aged 47, died May 17, of a kidney infection.

Dr. Victor Emanuel Weyher, Kinston, aged 84, died July 2.

OKLAHOMA

Dr. L. J. Moorman, Oklahoma City, has been elected a member of the Executive Committee of the National Tuberculosis Association.

The Southern Oklahoma Medical Association held its June meeting in Sulphur.

Dr. Divonis Worten, Pawhuska, has been studying in Europe for three months.

Deaths

Dr. Franklin Pitman Batchelder, Sapulpa, aged 73, died in March.

Dr. John A. McAfee, Comanche, aged 75, died April 15, of cerebral hemorrhage.

Dr. James Henry McCulloch, aged 62, died May 28, of complications arising from an attack of influenza.

Dr. Antonio D. Young, Oklahoma City, aged 57, died June 3.

SOUTH CAROLINA

Deaths

Dr. David Keene Briggs, Blackville, aged 67, died April 10, of gangrene, following embolism.

Dr. Lorie W. Moore, Lake City, aged 41, died May 6, of carcinoma of the gall-bladder.

Dr. Cyril Thomas Wyche, Prosperity, aged 72, died May 4, of arteriosclerosis and cerebral hemorrhage.

TENNESSEE

Warren County Medical Society has elected Dr. E. L. Mooneyham, Rock Island, President, and Dr. J. S. Harris, McMinnville, Secretary.

East Tennessee Medical Society has elected Dr. T. B. Yancey, Kingsport, President; Dr. C. C. Vinsant, Maryville, Vice-President for Upper East Tennessee; Dr. L. L. Barnes, Sweetwater, Vice-President for Lower East Tennessee; and Dr. Jesse Hill, Knoxville, Secretary-Treasurer.

Middle Tennessee Medical Society has elected Dr. M. B. Davis, Nashville, President; Dr. J. H. Tilley, Lawrenceburg, Vice-President; Dr. Theo Morford, Nashville, Secretary-Treasurer.

West Tennessee Medical Society has elected Dr. H. T. Collier, McKenzie, President; Dr. Lawrence

(Continued on page 44)

Health officers find the two-injection package particularly convenient and time-saving.

Two injections produce immunity

DUE to its high antigenic value, *two* injections of Diphtheria Toxoid-Mulford establish immunity in six to eight weeks.

OTHER FEATURES:

Low total solids.
No serum.
Minimum reaction.
Stable.
Never acquires toxicity with age.

Supplied in packages for

1 IMMUNIZATION
Two 1 cc ampul-vials

10 IMMUNIZATIONS
Twenty 1 cc ampul-vials

15 IMMUNIZATIONS
One 30 cc vial

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DIPHTHERIA TOXOID-MULFORD

"A word fitly spoken—how good!"
This word came yesterday from a distinguished M.D.
—"The Storm has been tried and proven."

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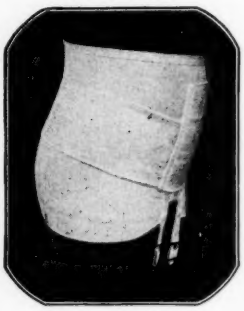
The New "Type N" Storm Supporter



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Long special laced back extension of soft material low on hips.

Hose supporters attached.

Takes Place of Corsets

Adaptable to Pregnancy, Ptosis, Hernia, Obesity, Sacro-Iliac Relaxation, High and Low Operations, etc.

Ask for Literature

Each belt made to order in 24 hours
KATHERINE L. STORM, M.D.
Originator, Owner and Maker
1701 Diamond Street Philadelphia

(Continued from page 42)

Lindsey, Covington, and Dr. O. W. Fesmire, Atwood, Vice-Presidents; Dr. I. A. McSwain, Paris, Secretary; Dr. George McSwain, Paris, Assistant Secretary. The next meeting will be held at McKenzie.

The Tri-County Medical Society (McMinn, Monroe and Loudon) held its monthly meeting at Sweetwater, July 24.

Dr. Arthur Quinn is now associated with Dr. Edward Clay Mitchell in the Mitchell-Quinn Children's Clinic at Memphis.

Dr. H. J. Jacobson, Dr. W. R. Blue and Dr. W. R. Graves are in the Babies and Childrens' Clinic with Dr. Arthur Jacobs, Memphis.

Dr. R. L. Murph, formerly of Trible, is now practicing at Halls.

Dr. Eugene R. Kellersberger, who has been a medical missionary in Africa for fourteen years, recently gave an address in Nashville. He said he had treated 6,000 cases of sleeping sickness in the Belgian Congo.

Dr. James A. Price, Oakville, has been elected Vice-President of the National Tuberculosis Association.

Deaths

Dr. Samuel W. Flanagin, Sevierville, aged 65, died April 14.

Dr. W. S. Gilmer, Kingsport, aged 82, died April 2, of arteriosclerosis.

Dr. Maxence B. Herman, Memphis, aged 77, died May 9, of carcinoma of the bladder and uremia.

Dr. Frank M. Rains, Medina, aged 76, died March 1, of heart disease.

Dr. Willie W. Walker, Dickson, aged 64, died April 22, of carcinoma of the rectum.

TEXAS

At the meeting of the Texas Railway Surgeons Association, held recently at Mineral Wells, Dr. George R. Enlow, Fort Worth, was elected President; Dr. A. M. Parsons, Houston, First Vice-President; Dr. S. A. Woodward, Fort Worth, Second Vice-President; Dr.

(Continued on page 46)

ORGANOTHERAPY

can be effective only through the use of dependable endocrine products. The reputation and integrity of the manufacturer is the physician's only guarantee of reliability of those organotherapeutic products for which there is no chemical or biological assay. Every manufacturing process of all our products is supervised by our Analytical and Research Department.

DESSICATED PITUITARY BODY, U.S.P.
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DRIED SUPRARENALS, U.S.P.
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Insure potency and constancy of action by prescribing the products of

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The "radical" cure of MALARIA

TO obtain a "radical" cure of malaria, the blood must be cleared of all parasites—both the schizonts that cause the attacks and the gametes that transmit the disease. This cannot be accomplished by quinin which fails to destroy the gametes and hence does not prevent relapses nor the spread of infection by the mosquito.

Plasmochin Compound eradicates all malarial parasites. It is the only remedy which definitely affects the gametes and is more effective in destroying the schizonts than quinin alone.

Plasmochin Compound promptly controls the acute manifestations, rapidly reduces the size of the spleen, guards against recurrences and decreases the incidence of malaria.

The dose of Plasmochin Compound is one tablet with 5 grains of quinin: for adults, four times daily; for children, once to three times daily, according to age. As a rule, one course of treatment for 14 days is sufficient.

Plasmochin Compound is supplied in bottles of 50 tablets. Also Plasmochin (plain) tablets, for cases of marked quinin idiosyncrasy, in bottles of 25 tablets.

Literature on Request

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Winthrop Quality has no substitute

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(Continued from page 44)

Ross Trigg, Fort Worth, Secretary-Treasurer, re-elected.

At the meeting of the Texas Neurological Society, which met at Mineral Wells, Dr. William Keiller, Galveston, was elected President; Dr. J. A. McIntosh, San Antonio, First Vice-President; Dr. John Preston, Austin, Second Vice-President; Dr. Wilmer Allison, Fort Worth, Secretary-Treasurer, reelected.

Dr. William C. Farmer, San Antonio, has been elected President of the Texas Public Health Association at Houston.

Deaths

Dr. James Anderson, Fort Worth, aged 71, died May 8, of chronic myocarditis, asthma and pulmonary arteriosclerosis.

Dr. William C. Burke, Dallas, aged 75, died May 22, of cerebral hemorrhage and nephritis.

Dr. Charles M. Decker, San Antonio, aged 69, died April 14, of lobar pneumonia and infectious agranulocytosis.

Dr. Albert L. Lane, Wichita Falls, aged 50, died April 16, of hypertension and myocarditis.

VIRGINIA

The Medical Society of Virginia will hold its sixty-first annual meeting in Norfolk, October 21, 22 and 23.

Piedmont Medical Society has elected Dr. J. N. Clore, Madison, President; Dr. J. N. Barney, Fredericksburg, Vice-President; Dr. W. E. Bray, University, Secretary-Treasurer, reelected.

The Virginia Society of Ophthalmology and Otolaryngology has elected Dr. Fletcher D. Woodward, Charlottesville (retiring Secretary), President; Dr. Charles A. Young, Roanoke, Vice-President; Dr. H. Grant Preston, Harrisonburg, Secretary-Treasurer. Richmond was selected for the 1931 meeting place.

CLASSIFIED ADVERTISEMENTS

PHYSICIAN WANTED for a rural practice in Northern Virginia, fifty miles from Washington, D. C., in a rich, high, beautiful section with good schools, churches, excellent people and some bad roads. Collections 80 to 95 per cent—excellent territory, with good income. Please give the following information in your first letter: Age, married or single, number of children with ages; where born, where educated, when and where graduated in medicine; internship, if any, when and where; religion of self and wife; membership in fraternities, clubs, lodges, etc.; do you hold a license in Virginia? Address, Box 222, Warrenton, Virginia.

X-RAY and laboratory technician desires position with hospital or clinic. Four years' experience. Special training in medical school. College graduate. Best references. Address, H, care S. M. J.

TECHNICIANS are in demand. We are successfully training laboratory and x-ray workers. Send us your assistant and we will return you a competent technician. If you are in immediate need of a well-trained helper, write or phone. Full information upon request. Alabama Pathological Laboratory, Birmingham General Hospital, Birmingham, Ala.

LABORATORY AND X-RAY TECHNICIANS—I have several highly trained combined laboratory and x-ray technicians and office assistants available for positions in hospitals, clinics, surgeons' and physicians' offices, state and municipal laboratories. Dr. L. H. South, Laboratory Service Bureau, Kentucky State Board of Health, Louisville, Ky.

DRUG AND ALCOHOLIC PATIENTS are humanely and successfully treated in Glenwood Park Sanitarium, Greensboro, N. C.; reprints of articles mailed upon request. Address W. C. Ashworth, M.D., Owner, Greensboro, N. C.

Dr. J. F. Alsop, Prospect, recently took a post-graduate course at Tulane University at New Orleans, Louisiana.

Dr. Caleb S. Stone, Jr., who has just completed a year as Resident in Surgery at the University Hospital, University, has located at Farmville and will limit his practice to surgery.

Dr. Basil B. Jones, Richmond, has been elected Chief of the Medical Service of the Children's Home Society of Virginia, succeeding Dr. Frank K. Lord, who resigned after serving for the past ten years.

Dr. Reid White, Jr., Lexington, has been elected a member of the Central Council of the Lexington Red Cross Chapter for this year.

Dr. J. Shelton Horsley, Richmond, by invitation, gave the surgical oration before the Mississippi State Medical Association at the annual meeting in April.

The Alumni Association of the Medical College of Virginia presented Dr. George T. Snead, of Pungo, Princess Anne County, a loving cup in commemoration of his completion of fifty years of practice.

Dr. C. C. Speidel, University, will represent the University Medical School at the Second International Congress of Anatomists, meeting in Amsterdam the middle of August. He will read a paper prepared jointly with Dr. H. E. Jordan.

Dr. Francis R. Crawford, who has been located at Farmville for some months, has returned to China, where he will again take up his work at the Presbyterian Hospital at Kashing. Dr. Crawford is a medical missionary of the Southern Presbyterian Church.

Dr. R. H. Courtney, Dr. Thos. E. Hughes, Dr. Powell Williams and Dr. Emory Hill, of Richmond, have been elected honorary members of the Richmond Chapter of the Virginia Association of Workers for the Blind, this in recognition of their work with the blind.

Dr. Lawrence T. Royster, University, presided over the meeting of the Association of American Teachers of the Diseases of Children held in Detroit, Michigan, in June.

Dr. Francis Ernest Hinchman and Miss Justina Veronica Koss, both of Richmond, were married June 3.

Dr. George B. Arnold, Colony, and Miss Frances Williamson, Lynchburg, were married May 21.

Deaths

Dr. Samuel Conway Crow, Norfolk, aged 55, died April 11 of hypertrophic cirrhosis of the liver.

Dr. John W. Dillard, Lynchburg, aged 77, died May 19.

Dr. Lynn J. Gallup, Norfolk, aged 52, died May 4 of cerebral hemorrhage.

Dr. Walter Stith Phillips, Rapidan, aged 60, died March 5, of heart disease.

Dr. J. R. Shacklette, Harrisonburg, died June 6 of a stroke of apoplexy.

WEST VIRGINIA

Dr. Walter E. Vest, Huntington, has been chosen President of the Alumni Association of the Medical College of Virginia.

The University of Georgia recently conferred on Dr. David Littlejohn, Charleston, the degree of Doctor of Public Health, this in recognition of his work in the field of public health and for his thesis on "Rural Health Needs and How Best Supplied."

Brooke County Medical Society has elected Dr. H. F. Nolte, Beechbottom, President; Dr. W. J. MacDonald, Wellsburg, Vice-President; Dr. L. J. Bernstein, Wellsburg, Secretary-Treasurer.

Dr. Claude L. Holland, Fairmont, is taking special work in pediatrics at Harvard.

The Woman's Auxiliary of the West Virginia State Medical Association elected Mrs. S. S. Hall, Fairmont, President; Mrs. A. H. Hoge, Bluefield, First Vice-President; Mrs. H. S. Brake, Clarksburg, Second Vice-President; Mrs. Brinley John, Morgantown, Recording Secretary; Mrs. J. S. Klumpp, Huntington, Corresponding Secretary; Mrs. F. C. Hodges, Huntington, Treasurer; Mrs. R. H. Edmondson, Morgantown, Historian.

Deaths

Dr. Hiram Winter, Looneyville, aged 50, died April 13, of bronchiectasis.

Expectant and Nursing Mothers Need this Food-Iron Concentrate

EXTRA demands are made upon the mother during pregnancy. The developing infant requires iron, not only for building up the blood which its body contains at birth, but, in addition, an equal amount to store up in its liver for use after birth.

The amount of spinach or other greens needed to supply the unusual iron requirement is too great to be eaten without inconvenience, while the ordinary iron preparations available are not well utilized by the body in making hemoglobin.

Fortunately, however, these objections have been overcome by the introduction of a food-iron concentrate—

Food-Ferrin

In Food-Ferrin are found all the elements needed by the body for blood building. Under its use anemic animals recovered with remarkable rapidity, while ample clinical confirmation testifies to its value in actual practice.

Food-Ferrin is not a medicine, but a highly efficient blood-building food. It is agreeable to taste, never disturbs but aids digestion, does not injure the teeth, and never causes constipation.

So that you can make a test of Food-Ferrin, we would like to send you a physicians' sample with our compliments. The coupon is for your convenience.

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Dextri-Maltose for Modifying Lactic Acid Milk

In using lactic acid milk for feeding infants, physicians find Dextri-Maltose the carbohydrate of choice:

To begin with, Dextri-Maltose is a bacteriologically clean product, unattractive to flies, dirt, etc. It is dry, and easy to measure accurately.

Moreover, Dextri-Maltose is prepared primarily for infant-feeding purposes by a natural diastatic action.

Finally, Dextri-Maltose is never advertised to the public but only to the physician, prescribed by him according to the individual requirements of each baby.

DEXTRI-MALTOSE NOS. 1, 2 AND 3, SUPPLIED IN 1-LB. AND 5-LB. TINS AT DRUGGISTS. SAMPLES AND LITERATURE ON REQUEST. MEAD JOHNSON & CO., EVANSVILLE, IND., U.S.A.

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When physicians are confronted with undependable fresh milk supplies in feeding infants, it is well to consider the use of reliable powdered whole milks such as Mead's or the well-known Klim brand. Such milk is safe, of standard composition, and is easily reliquefied.

Under these conditions, Dextri-Maltose is the physician's carbohydrate of choice just as it is when fresh cow's milk is employed.

The best method to follow is first to restore the powdered milk in the proportion of one ounce of milk to seven ounces of water, and then to proceed building up the formula as usual.

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MEAD'S VIOSTEROL, COUNCIL-ACCEPTED

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To get the identical product,

originally called Acterol, specify MEAD'S Viosterol in Oil, 100 D. It is made in the same laboratories under the same conditions by the same longest-experienced personnel with the same clinical background of the five fellowships that established potency and dosage. Specify MEAD'S Viosterol to get the same identical product.

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Whereas

The physicians of this country evidence an almost unanimous preference for Dextri-Maltose when modifying Protein Milk, as well as cow's milk formulae

Whereas

The cases requiring Protein Milk are difficult to feed, representing sick babies with severe nutritional upsets. Therefore,

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That, in the feeding of healthy babies, as a modifier of cow's milk, the physician's carbohydrate of choice is

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"DEXTRI-MALTOSE WITH VITAMIN B" IS NOW ALSO AVAILABLE TO PHYSICIANS WHO ARE INTERESTED IN ITS APPETITE-AND-GROWTH-STIMULATING PROPERTIES. PLEASE WRITE FOR SAMPLES TO MEAD JOHNSON & COMPANY, EVANSVILLE, INDIANA, U.S.A., SPECIALISTS IN INFANT DIET MATERIALS.

Mucous Membrane Inflammations

NEO-SILVOL is a valuable disinfectant in its specific field of treating mucous membrane inflammations without irritation. When the etiological factor is an infection—streptococcus, pneumococcus, staphylococcus, or gonococcus—solutions of NEO-SILVOL have been found dependable in soothing the inflammatory process, in controlling growth of bacteria, and in promoting a return to normal conditions.

NEO-SILVOL, a colloidal silver iodide compound, is effective without irritation. It does not precipitate tissue chlorides, or coagulate albumen, despite its antiseptic power. It leaves no disagreeable stains.

Select NEO-SILVOL for the treatment of any mucous membrane inflammation—in eye, ear, nose, throat, urethra or bladder.

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In 1-ounce and 4-ounce bottles of the granules.
In 6-grain capsules, bottles of 50, for making solutions.
As a 5% ointment in 1-drachm tubes.
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